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# The Mission of the Engineers – Looking Back on My Own 35 Years –

Tadashi Ito  
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## 1. Introduction

What is the mission of the engineers? I think it is to make society better by technology. It must not be technology development for technology. The pleasure that I could contribute specifically to society with my own created technology cannot be changed anything. For that purpose, first step is to become a leading expert in a certain technical field regardless of size. Continuous efforts to reveal things with curiosity and inquiry are necessary. Once you have the pillar of technology on yourself, the thing to do next is to be able to respond sensitively to the movement of the world. That's what we need for collaboration skills. It is best if you evolve your skills by collaboration and make it to society. I hope that what I did helps everyone.

## 2. Start as an Engineer

I started as an engineer when I joined the NTT laboratories in 1987. Before joining the NTT labs, I was engaged in the research theme at the university's laboratory, but at that time I was a student of the mechanical engineering department rather than a researcher. The research theme in the university laboratory concerned thermo physical properties. The objective was to accurately measure the viscosity coefficient of the high temperature melt. The substance to be measured was used for the coolant of the nuclear reactor, and the measurement data was expected to be utilized as data for the design of the nuclear reactor. However, it was unclear as to whether data measured by itself was used for reactor design, so there was no real sense that we are useful for society. At that time, I came to work at a company. I wanted to develop technology that is useful for our society. Just then, Japanese society was about to enter the development stage of the information and communications industry. In 1981 Nippon Telegraph and Telephone Public Corporation (present Nippon Telegraph and Telephone Corporation) revealed the basic concept of Information Network System (INS) [1]. In addition to conventional speech, various kinds of media, such as images, which were converted to digital data, were targeted for communication. In addition, communication has been expanded from those of conventional person-to-person to those including person-to-machine and machine-to-machine. I wanted to engage in technology development in this world. For me, information communication is an attractive one that makes it

possible to bring people and people closer to zero as much as possible, to give people dreams. In 1987, I took the first step as an engineer in the field of information communication. I think that the desire to contribute to society through technology development was formed at this time.

## 3. To Become an Engineer of the Information and Communication Field

I was beginning to start as a technician at the NTT laboratories in a technology field completely different from that at the university. First I worked on trial development of a broadband ISDN [2] system. Commercial service of ISDN [3] was started in Japan in April 1988. Two menus were provided, “INS Net 64” (2B1D, Basic Rate Interface) which overlays two B channels (= 64 kbps × 2) and one D channel (16 kbps) with two copper wires for telephone, “INS Net 1500” (23 B 1 D, Primary Rate Interface) which transmits 23 B channels (= 64 kbps × 23) and 1 D channel (64 kbps) with one optical fiber. Broadband ISDN aimed at making ISDN faster and enabling real-time video distribution. The subscriber interface speed in broadband ISDN was 156 Mbps. In addition, it aimed at realizing multimedia communication by a fixed length packet switching system called ATM (Asynchronous Transfer Mode). I was engaged in the development of ATM packet processing system and LSI applied to subscriber system. When I was to develop in a technical field different from the time of university, I spent days reading technical books, asking seniors for teaching, sleeping with notes on the bedside so as not to forget the flash. I wanted to make my own standpoint as soon as possible. Thus I succeeded in prototyping the ATM packet processing LSI shown in Fig. 1.

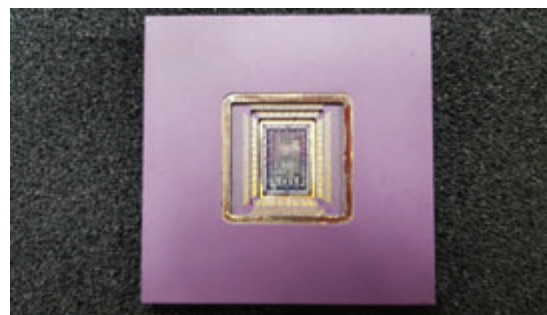


Fig. 1 ATM packet processing LSI.

I could not do without help from the surroundings. By applying the latest LSI process, we have developed a communication processing LSI of about 30k-gate with processing capacity of 20 Mbps  $\times$  8 bits. After that, as an engineer at the Career Labs., I promoted the research and development of next generation network by applying ATM technologies. About the same time, Internet technology based on variable length packets came up, but I never had any doubt that ATM is the key technology of the next generation network.

#### 4. Regret as a Engineer

I think that it is the mission of engineers to make technologies practical and enrich society. I think that there is nothing so pleasing if they are technologies that you created for practical use. However, it must be the result. I think that should not be the purpose. We must objectively compare with technologies of other people, and estimate technologies to be put to practical use assuming progress of technologies in the medium term. I think that is the conscience of engineers. I failed to identify the technology to be put to practical use twice in the past.

The first time is judgment against Internet technology. In the 1990s, many career laboratories were working on practical application of multimedia network by ATM technology with fixed length packets. At that time computer technology evolved and individual ownership of computing resources began. As represented by the LAN technology, network technology has been integrated with information processing technology, and it is getting rid of the carrier-specific one. Meanwhile, engineers at many career laboratories including me thought that it was not possible to apply the best effort internet technology to the carrier network. Looking back now, I could not foresee the breakthrough development of information technology at that time. Also, we were unable to tell that technologies and services are shifting from career driven to servicer driven initiatives. I think that I was obsessed with my own technology too much. Although ATM was commercialized as a carrier service in Japan, it was mainly a dedicated line service, and it could not be a next generation infrastructure aimed at by carriers. On the other hand, Internet technology has become the core of communication infrastructure technology including telephone, due to progress of computer technology [4].

The second time is judgment against data center technologies. In the 2000s, broadbandization of Internet access services by carriers advanced with FTTH [5]. As represented by the Web, we got information over the network, and the cloud has advanced. The size of data centers that manage information processing on the cloud has increased year by year, and the network in the data center has become huge and complicated. In addition, the data center has been multi-located, and it became necessary to seamlessly connect the data centers. Against this backdrop, there is a need for network software

technology (SDN: Software Defined Network) [6]. Also, due to the diversification of services by IoT etc., non-uniformity of data exchange has also progressed, necessitating the need for distributed networking technology such as edge computing. Remember that the carrier network is part of the cloud servicer information processing infrastructure such as data centers. These technological developments are driven by OTT operators such as Google and Facebook. The created technologies have been actively opened through the consortium. It is in a situation that it cannot be applied in the conventional carrier-driven technology development model. About 2010, I thought that such changes in external circumstances were known, but I thought that it was technologies and movements specialized in data centers. It made the same mistake that I mistook Internet technology in the 1990s.

#### 5. Conclusion

By looking back on my 30 years as an engineer in the field of information and communication technologies, I showed my idea about what mission as an engineer is. It would be greatly appreciated if you would like to refer to the necessity of having your own core technologies, constant objectivity towards your own technology, and considering actively using other technologies. New technologies, new players, new business models will come out with the progress of 5 G and IoT (Internet of Things), and the role as an engineer will become important more and more. Finally, I would like to express my deep appreciation to the associations of IEICE, NTT and other related people who have taught me so far.

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# Epoch-making Happenings in My Life as a Researcher

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## 1. Introduction

I started my carrier as an engineer to develop telephone switching systems right after my graduation from a college. Now, I am teaching and doing research in a university. There were a few events that brought me to where I am.

## 2. Being a Graduate Student in US

I started my second college life as a Master student in University of Illinois at Urbana-Champaign (UIUC). The company I worked for, Oki Electric, sent me to the school. I was very lucky. This was the first big happening in my carrier.

I belonged to Dept. of Computer Science. In my school, one semester lasts for 16 weeks without any interruption. Every course had three hours of classes for a week. If the class takes place twice a week, then one class lasts for 90 min. Also, to my surprise, final exams of the courses last for 3 hours.

Ph.D. students were required to take courses. Ph.D. students had the same course load as Master students. That was very different from Japanese system where Ph. D. students are not required to take any courses and concentrate on research.

Every course gave us many assignments. Most of weekends are spent for assignments. Due to the heavy load, I could take only three courses in a semester.

An uncomfortable experience is selection of the advisor for my thesis research. Professors were unwilling to take Master students because they are not very productive in research while I was a Master student.

The hardest time in my experience as a student was preparation for my qualifying exam for Ph.D. The topic area to be covered by the exam was broad. Three professors made my exam committee. They can ask me any questions from the designated area. I needed to go through all textbooks of the field. The stack of textbooks was as high as 50 cm. More than a month I kept reading the books in my small dorm room. I was grilled by the committee for more than two hours in the exam, but fortunately, I could pass it.

Japan was experiencing economic bubble when I was in UIUC. The manager of the personnel department told me that I can continue for Ph.D. if I am willing. So, I took the qualifying exam and passed. Then I asked for the extension. I was very fortunate.

## 3. Real-Time Systems

My research topic was eventually determined to be real-time systems. Jack Stankovic at University of Massachusetts started the movement of theoretical reconsideration of real-time systems a few years back from the time I started my Master course. More specifically, I was focused on database systems for real-time applications.

Famous scheduling algorithms for real-time systems are Rate Monotone (RM) and Earliest Deadline First (EDF) [1]. Both of the algorithms schedule tasks according to the priorities assigned to the tasks and the tasks are supposed to be initiated repeatedly with certain intervals. RM can guarantee all tasks complete their execution before the next initiation of the same tasks as long as the processor utilization is less than  $m(2^{1/m} - 1)$  where  $m$  is the number of tasks. EDF assigns the highest priority to the task with the earliest deadline. It is considered to be an optimal scheduling algorithm since it can utilize a processor 100% without missing deadlines.

When exclusive resources such as shared data are shared among tasks, execution of a high priority task

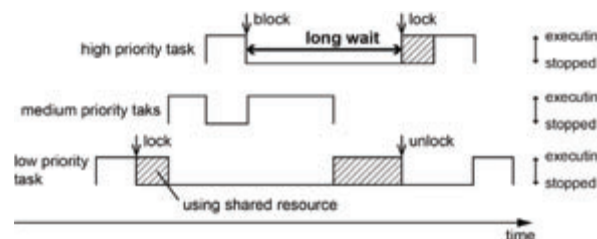


Fig. 1 Priority Inversion.

may be blocked by a lower priority task holding a shared exclusive resource (Fig. 1). This phenomenon is called *Priority Inversion* [2]. If a medium priority task executes for long, then the high priority task is kept waited unnecessarily for a long time and may cause deadline miss of the high priority task. This problem can be solved by *Priority Inheritance* [2].

I tried to solve the Priority Inversion problem in database environment where serializability is required in addition [3]. The proposed scheduling algorithm is called *Convex Ceiling Protocol* (CCP). *Priority Ceiling* is a value assigned to a shared resource. Priority Ceiling of a resource is defined to be the maximum priority of tasks accessing the resource. It was proven that execution of tasks satisfies serializability as well as avoiding Priority Inversion if the maximum Priority



Ceilings of resources acquired by a task varies with convex curve. I wrote my Ph.D. dissertation on CCP and succeeded in getting Ph.D.

After coming back to Japan, I had a chance to attend a flagship conference of real-time system research community called Real-Time Systems Symposium. There I encountered a very moving happening.

In a keynote talk of the conference, the president of Wind River System, the developer of VxWORKS real-time OS, introduced a story about Martian lander, a vehicle to explore Mars by remote control. When the lander was sent to Mars, the lander experienced intermittent reset. The lander used VxWORKS as its OS. So, Wind River people started to remote debug.

What they found was Priority Inversion which caused blocking of a high priority real-time task for an extended time. The blocking caused reset of the system. Since VxWORKS had implemented Priority Inheritance in its mechanism, they changed one instruction to use Priority Inheritance, compiled, sent the program to Mars, and fixed the bug. The theoreticians who found Priority Inversion and proposed Priority Inheritance were in the audience of the speech, and received applause. By attending the event, I really wished to come up with some theoretical findings which cannot be wrong. It was a very moving happening for me.

#### 4. Network Coding and Peer-to-Peer

I came back to Japan after getting my Ph.D. and worked for the company for some years. Then, I had a chance to get a position in Waseda University. This was another big happening in my life.

I started to look at distributed computing. One result amused me was network coder placement for BitTorrent [4].

Network coding can achieve the maximum network flow. The simplest example can be given by the well-known butterfly network (Fig. 2) where both data  $a$  and  $b$  can be transferred in one cycle by performing encoding at node  $W$ .

We applied network coding to BitTorrent file sharing. The argument of us was that we do not need to place encoders at every node to achieve good network flow and figured out good nodes to place coders. On our way to come to the result, we identified the cause of the efficient network usage of network coding is the diversification of data and exploited that fact to identify good coding nodes.

#### 5. Information Centric Networking

Then, one of my colleagues, Prof. Yong Jin Park introduced me *Information Centric Networking* (ICN).

We started a study group with a few professors and their students. We continued the study group for a few years, and then we came across an EU-JP joint research proposal call related to ICN.

We formed a consortium of eight organizations, four from Japan and four from Europe. We were granted for the project called GreenICN [5]. In the project, we worked on video delivery in ICN. More specifically, we proposed algorithms to cache video contents. The proposed caching and cache replacement policies consider popularity of both title level and segment level of video contents [6].

Since GreenICN was an EU-JP joint project, it was a very good chance to get to know researchers in Europe. The management and execution of the project different from the one in Japan. Again, it was an epoch-making happening in my career.

And now I am involved in another EU-JP joint project called Fed4IoT [7]. Fed4IoT is an attempt to federate IoT systems with different platforms and to provide virtualized IoT devices so that IoT service providers can develop IoT services with existing IoT devices with low cost and ease. Fed4IoT is, in a sense, a consequence of the previous GreenICN project since some of the members of the project came from GreenICN. Involvement in EU-JP project was another epoch-making occurrence in my career.

#### 6. Conclusion

In this article, I looked back epoch-making happenings in my career. In this recollection, I can see I was very fortunate to be supported by many people. I cannot be too grateful to all the people providing me the opportunities and support. Here I express my sincere appreciation to all of them.

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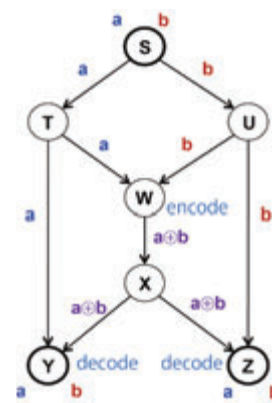


Fig. 2 Network Coding.

# Monitoring Techniques with Radio Waves

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## 1. Introduction

In recent years, many countries have been facing the problem of a fast-aging population because of the increase of the life expectancy and the decrease of the birth rates. According to those facts, the cases where old people are staying alone are becoming very common. Remote monitoring in e-healthcare has become a hot issue in research fields and industries. To realize remote monitoring, the system should provide user's context including activities, locations, and environments' states, to doctors, nurses, and families. Currently, sensors have more attention for remote monitoring owing to low cost and high privacy protection, than video cameras. However, one main drawback of the sensors such as accelerometer, gyro and pressure, is that the user must hold or be close to the sensors. It is inconvenient and uncomfortable, and sometimes people forget to attach such sensors.

Instead of these cameras and wearable devices, monitoring techniques with radio waves that do not require images nor wearable devices are attracting much attentions. In this article, we introduce some of monitoring techniques with radio waves.

## 2. Monitoring Techniques with Radio Waves

Monitoring techniques with radio waves are often referred to as radio wave sensors. Radio wave sensors detect an existence of a person and a behavior of a person based on the change of radio wave propagation. Many simple radio sensors detect existence or presence of people based on the change in received signal strength (RSS: Received Signal Strength).

The sensor based on RSS can be realized with a simple configuration, however, the influence of noise and fading is relatively large. Thus, sufficient detection accuracy cannot be obtained.

The radio wave sensors exploit the change in the environment caused by the presence or absence of a person and the change in the RSS. In addition some radio wave sensors exploit the changes in the propagation channel and the signal subspace obtained by the eigenvalue decomposition of the correlation matrix of the signal received by the array antenna.

In the following, we introduce various radio wave sensors.

### 2.1 Radio Tomography

Radio tomography technology surrounds the observation target area with transceivers of radio waves, and based on the change of the RSS of radio waves propagating within the area, it detects whether or not there is a person in the area.

Figure 1 shows the image of radio tomography. As shown in the figure, radio waves are transmitted and received between transceivers installed so as to surround the observation target area, and RSS is observed. When there are many radio links on a diagonal line, when there is a person, the RSS of each radio link is attenuated due to absorption, reflection, diffraction or the like. Based on the RSS attenuation of each wireless link, the presence / absence of a person in the area and the position of a person are specified.

Since the position of the person inside can be specified from the outside of the building, applications such as discovery of survivors at the time of a disaster, security, smart room and smart house that observe human behavior are expected. The position estimation accuracy of the radio tomography depends on the observation target area size, the number of transceivers to be installed, the frequency of the radio waves used, the structure of the building, and the like. For that reason, development of algorithms with enhanced noise immunity [1], etc. are studied.

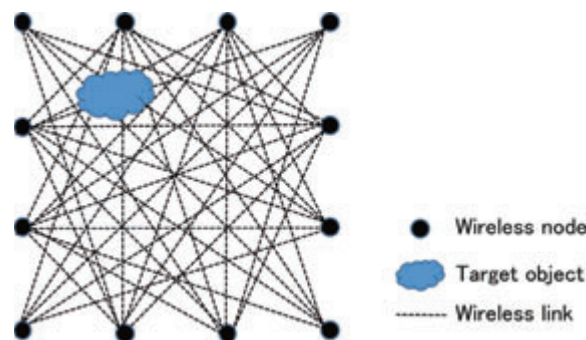


Fig. 1 An image of Radio Tomography.

### 2.2 Array Sensor

Array sensor is one the smart sensors that we developed [2-4]. Figure 2 shows a trial product of the array sensor. The array sensor exploits an antenna array on the receiver side and decomposes received signals into eigenvectors and eigenvalues by eigenvalue decomposition (EVD). Depending on applications, it uses these components and sometimes other features, such as received signal strength (RSS). When an event (e.g. falling down) occurs, the propagation environment changes, and thus the features such as eigenvector and eigenvalue related to the propagation also change. Based on the change of the features, we can detect an event without using camera. We can detect and classify simple activities, just based on the



1<sup>st</sup> eigenvalue spanning signal subspace. For classification of more complex activities, such as sitting in a bathtub and falling in a bathroom, the array sensor can classify by using machine learning algorithm based on those features obtained by the array sensor. Since the array sensor exploits not an exact direction of arrival (DOA) information but the change of radio propagation, it does not need a precisely-designed array antenna where its antenna positions are designed precisely and it needs calibration; just plural antennas are needed so that the array sensor can be realized at low cost and is easy to install. The array sensor can also realize passive localization using support vector machine (SVM) based on those features in a fingerprinting manner.



Fig. 2 Array sensor.

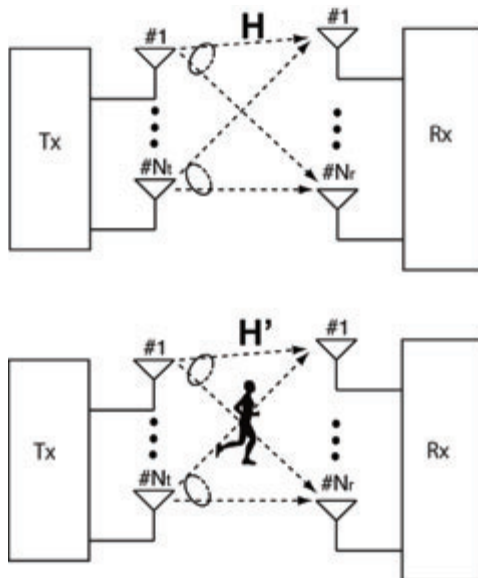


Fig. 3 MIMO sensor.

**2.3 MIMO Sensor**

In recent years, Multiple-Input Multiple-Output (MIMO) for transmitting high-speed and large-capacity information using a plurality of antennas at a transceiver has become an indispensable technology for wireless Local Area Network (LAN) and cellular systems. As with MIMO, there are several sensors using multiple antennas in transceivers, but sensors that detect people based on MIMO propagation channels are called MIMO sensors in Japan [5,6]. The concept of MIMO sensor is shown in Fig. 3. A MIMO sensor is

a sensor that detects a change in propagation due to the presence or behavior of a person based on a change in a propagation channel. In the MIMO sensor, the time correlation between the propagation channel acquired when the observation room is unmanned and the propagation channel at the observation is taken, and the presence or absence of a person is detected from the variation. It has been reported that in some experimental environments MIMO sensors achieve relatively high intrusion detection rates. Note that it is necessary for the MIMO sensor to estimate the channel state information (CSI) between a plurality of transmission / reception antennas by using a pilot signal or the like.

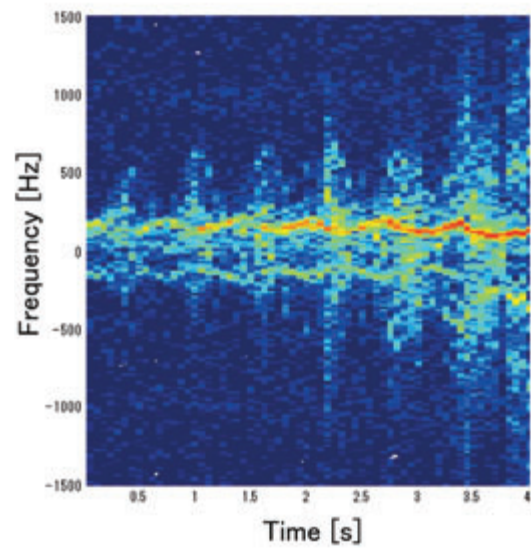


Fig. 4 Doppler spectrum when a person is walking.

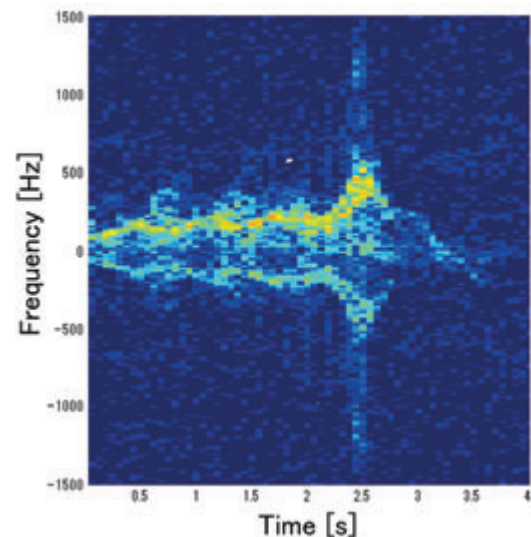


Fig. 5 Doppler spectrum when a person falls on walking.

**2.4 Doppler Sensor**

Doppler sensor is a sensor using the Doppler effect, also called Doppler radar. The Doppler sensor emits a

radio wave (microwave), and compares the frequency of the reflected radio wave with the frequency of the emitted radio wave, thereby detecting the speed and movement of a person or an object. In general, it is used for speed gun that measures the speed of the object, distance measurement such as collision prevention, human sense / energy saving / automatic door sensor and the like. In the Doppler sensor, frequencies of 10.5 GHz band and 24 GHz band, which are permitted to be used for sensors as “radio equipment for specific low power radio station mobile body detection sensor” are generally used.

Discrimination by behavioral learning based on Doppler information obtained by a Doppler sensor is often used for identification of behavior or the like using a Doppler sensor. The Doppler spectrum diagram is shown in Figs. 4 and 5, when a person falls on walking and walking, respectively. In [7], a fall detection system using multiple Doppler sensors has been proposed, and a high fall detection rate of 95.5% has been reported.

In addition to behavior, the Doppler sensor can also detect vital signals such as heartbeat, breathing, blinking in a non-contact manner [8,9].

### 3. Conclusion

In this article, we introduced various radio wave sensors. To realize a safe and secure society, it is important to monitor in the town and watch over indoors and outdoors. At that time, protection of privacy is also important. A radio wave sensor is one of promising technologies, because watching can be realized while protecting privacy. However, it is difficult to satisfy various demands in various environments by using only one technology, not limited to a radio wave sensor. To realize a safe and secure society, it is necessary to properly use multiple technologies in consideration of the environment and requirements.

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# Report on Signing Ceremony for Sister Society Renewal between IEICE-CS and KICS

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## 1. Introduction

This letter reports the signing ceremony for a renewal of the sister society (SS) agreement between the IEICE Communications Society (IEICE-CS) and the Korean Institute of Communications and Information Sciences (KICS).

## 2. Signing Ceremony

The signing ceremony of the SS agreement between the IEICE-CS and the KICS was held at the Maison Glad Jeju on October 18<sup>th</sup>, 2018 during the period of the 9<sup>th</sup> International Conference on ICT Convergence (ICTC2018) which was sponsored by the KICS and was technically Co-Sponsored by the IEICE-CS. From the KICS, Prof. Chung G. Kang (President), Prof. Yeong Min Jang (Executive Vice President), Prof. Younghan Kim (Vice President for Information Affairs), Prof. Hong-Yeop Song (Vice President for Academic Affairs), Prof. Yoan Shin (Vice President for Business Affairs), Prof. Seongho Jeong (Executive Director for Planning) attended, while from the IEICE-CS, Prof. Hisaya Hadama (Vice President, Chair, Council of Tech. Committee Representatives) and Mr. Akira Yamada (Director, Planning and Member Activities) attended.

Figure 1 and 2 show photographs of the signing ceremony.

The main cooperation agreement between KICS and IEICE-CS, and the dual membership side agreement between KICS and IEICE-CS were updated. These agreements will be effective by the end of 2021.

In the signing ceremony, Prof. Chung G. Kang, the president of the KICS, introduced the current status and activities of the KICS. He mentioned that the KICS and the IEICE-CS have made excellent relationship for a long time, and the KICS hopes to extend further cooperation with the IEICE-CS. In response to Prof. Chung G. Kang's friendly speech, Prof. Hisaya Hadama, the vice president of the IEICE-CS, made sincere thanks to holding the excellent signing ceremony. He also introduced the current status of the IEICE-CS, and his wish to further fruitful relationship with the KICS.



Fig. 1 Picture of Signing Ceremony.



Fig. 2 Attendees for Signing Ceremony.

From left to right: Prof. Seongho Jeong, Mr. Akira Yamada, Prof. Hisaya Hadama, Prof. Yeong Min Jang, Prof. Younghan Kim, Prof. Chung G. Kang, Prof. Hong-Yeop Song, Prof. Yoan Shin

## 3. Acknowledgement

The authors would like to thank Ms. Grace E. Kim (Publication Assistant, KICS) for coordinating the signing ceremony for the sister society agreement between the IEICE-CS and the KICS.

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# Report on the 8<sup>th</sup> International Symposium on Network Virtualization

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## 1. Introduction

The eighth International Symposium on Network Virtualization [1] was held in September 28, 2018, at the University of Tokyo (UTokyo), Japan. The symposium has been held annually since 2011 to promote research and development of network virtualization and network softwarization through international collaboration of researchers, aiming at realizing new communications infrastructure using the technology.

## 2. Overview

The theme of this year's symposium was "Network Softwarization and Edge Cloud for Diverse Beyond 5G/IoT Services." Latest research activities and technological issues on network softwarization and edge cloud were discussed with the focus on Beyond 5G mobile networking and Internet of Things (IoT). The symposium was co-hosted by the IEICE Technical Committee on Network Virtualization; JSPS ITRC Network Virtualization Working Group; Graduate School of Interdisciplinary Information Studies, Graduate Program for Social ICT Global Creative Leaders (GCL), the UTokyo; The UTokyo Interfaculty Initiative in Information Studies; and NICT. Dr. Teruyuki Hasegawa of KDDI Corporation led the Program Committee. 63 researchers and engineers from both industry and academia joined the conference. A social gathering was held after the symposium to facilitate the international interaction.

## 3. Session Program

The symposium started with the greeting by Dr. Hasegawa, chair of this year's symposium, followed by three opening speeches by Dr. Mizuhiko Hosokawa of



Fig. 2 Greeting by Dr. Teruyuki Hasegawa (Chair).

NICT, Dr. Kiyohide Nakauchi of ITRC, and Prof. Toshiyuki Nakata of GCL.

In the following talk sessions, each of five invited speakers made a presentation in a 45-minutes time slot.

The first speaker was Dr. Abhimanyu Gosain of PAWR Project Office/Northeastern University. The title of his talk was "Platforms for Advanced Wireless Research (PAWR)." At first, he presented the guiding principle and architecture elements of PAWR project. Next, he introduced a research program of PAWR project, which is POWDER-RENEW. POWDER stands for platform for open wireless data-driven experimental research, and RENEW stands for a reconfigurable eco-system for next-generation end-to-end wireless. He also talked about edge cloud technologies such as multi-access edge computing (MEC).

The second speaker was Dr. Ivan Seskar of Rutgers University. The title of his talk was "Towards Next Generation of Wireless Networking Testbeds." At first, he introduced ONAP wireless lab (OWL), which is a combined lab of ONAP OpenLab project and ONF wireless working group. He also introduced COSMOS program of PAWR project. COSMOS stands for cloud-enhanced open software-defined mobile-wireless testbed for city-scale deployment. He talked about use case (e.g. augmented reality, smart city, and connected car), system architecture, key technologies (e.g. software-defined radio, mmWave, optics, and SDN/cloud), experimental research, and education toolkit.

The third speaker was Prof. Akihiro Nakao of the University of Tokyo. The title of his talk was "Application Specific RAN Slicing and URLLC Edge



Fig. 1 Audiences in the symposium.

Computing.” At first, he introduced Future Society Initiative SFGs (Sustainable Development Goals) project of the UTokyo. Next, he introduced EU-Japan 5G PAGODA project describing the concepts of “Network Slice for every service” and “Softwarization everywhere.” To achieve end-to-end programmability, it is important and challenging to softwarize base stations for data analytics in 5G networks. His laboratory has constructed Berlin-Tokyo softwarized mobile network infrastructure, and verified UE (User Equipment)-to-UE video call. He talked about unlicensed frequency band for mobile networking, U-LTE network virtualization, powerful tools for machine learning, P-GW (Gateway) centric architecture, and in-network deep learning. According to him, one use case is 4K/8K real-time drone surveillance using 5G cellular by means of technologies such as real-time object recognition via deep neural network (DNN) from drones and small form factor GPU for DNN in drones. He said that it is important to realize network slicing for URLLC/eMBB and user-defined spectrum slicing, and presented hierarchical fair service curve (HFSC) scheduling to isolate a URLLC slice.

The forth speaker was Dr. Robert Winters of VIAVI Solutions. The title of his talk is “Pressure Points for Massive IoT Deployments and What Role for Network Slicing ?” At first, he raised an issue of unpredictable behavior of massive and various kinds of IoT devices. He said that emulation for examining scalability and security of networks, combined 4G/5G end-to-end network architecture and management of IoT services’ performances will be challenging issues. On the other hand, he said that network slicing achieves business benefits of up to 40%, and its challenging issues are multi-domain orchestration, end-to-end security, highly-reliable control plane, and so on. As a solution for these issues, he introduced TeraVM which is a 3G/4G/5G core tester with real world applications.

The final speaker was Dr. Ved P. Kafle of NICT. The title of his talk was “Mechanisms for Resources Control in Network Slicing.” At first, he explained communication services related to 5G/IoT and network slicing for their services including process flow for virtual network construction. Next, he talked about automation of network construction and configurations,



Fig. 3 Presentation by Dr. Abhimanyu Gosain.



Fig. 4 Exhibition booths.

and introduced his latest researches on dynamic resource adjustments which consist of horizontal scaling, vertical scaling and internetwork scaling.

Following the talk session, there was a 90-minute Panel session. The moderator was Prof. Akihiro Nakao of the UTokyo. In addition to the invited speakers, Dr. Takashi Shimizu of NTT joined the session as a panelist. The main topic of this session was “Prediction for Year 2030,” which includes what will happen to softwarization, networking, landscape, and so on. Panelists gave their views on it. For example, 5G, network virtualization and softwarization will be mature and essential for our social life, and will be strongly connected and interacted with other technologies such as blockchain, AI and security. The amount of mobile traffic will be 100 times larger than present. Meanwhile, applications requiring low latency such as gaming, holoportation, drones, operating robots and heavy equipment, machine-to-machine communications as well as automated driving will drastically increase in networks of Year 2030. On the other hand, the power efficiency for blockchain and AI will be drastically improved by utilizing advanced technologies such as optics and quantum computing. Note that the above things are just predictions. At the end, the moderator raised a question: “When will the reliability of humans become lower than that of AI/machine ?” It would be too difficult to adequately answer this question, which might be a topic to be discussed in an NV symposium in the future.

In the exhibition room at the same building, total five exhibitors including VIAVI Solutions, the UTokyo, NICT, NTT and KDDI Research exhibit their newest activities using demonstrations and posters.

#### 4. Conclusion

Network softwarization and edge cloud technologies are paving the way towards realizing new infrastructures and services in the coming Beyond 5G/IoT era. This year’s symposium showed the latest moves of industry, academia and national research institute, which are making ever more concrete progresses in laboratories, field trials, or projects.

#### 5. Reference

[1] <http://www.ieice.org/~nv/english/symposium1>

# Report on EMC Joint Workshop 2018 Daejeon (EMCJ-WS 2018 Daejeon)

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## 1. Introduction

The Electromagnetic Compatibility Joint Workshop 2018 Daejeon (EMCJ-WS 2018 Daejeon) was held from Nov. 22 to Nov. 23, 2018 at the National Fab Center of KAIST (Korea Advanced Institute of Science and Technology) in Daejeon, Korea (Fig. 1). This article reports overview and statistical information of the workshop.



Fig. 1 The venue of EMCJ-WS 2018 Daejeon.

## 2. Technical Program

This is the 4<sup>th</sup> workshop that was held as the annual international activity of the technical committee on electromagnetic compatibility of IEICE co-sponsored with IEE-EMC and IEE-MAG. In this year, the workshop was held with the organizing committee that includes both KAIST and IEICE members: Prof. Jongho Kim as the chair, Prof. Jonghoon Kim and Prof. Takahiro Aoyagi as co-chairs, Prof. Seungyoung Ahn as TPC chair, and Dr. Jong Hwa Kwon as TPC co-chair. Table 1 summarizes the number of technical papers in EMCJ-WS 2018 Daejeon. The detailed program of the workshop is found on IEICE EMCJ web site [1] and the titles of the presentations are summarized below.

Table 1 Technical Papers of EMCJ-WS 2018.

	Oral	Poster	Invited	Total
Korea	4	8	3	15
Japan	8	12	2	22
Total	12	20	5	37

- (1) EMI Reduction Method for Wireless Charging Mobile Devices Application using Planar Resonance Reactive Shield
- (2) Study of Non-contact Heartbeat Sensing Method using EM Waves Passing through the Human Body
- (3) ESD Evaluation of Wireless Myoelectric Artificial Hand with Bio-Equivalent Arm Phantom
- (4) Design of Differential Transmission Lines with Periodic Structure for Crosstalk Suppression by Preference Set-based Design Method
- (5) Novel numerical analysis based on the finite-difference time-domain method in the low frequencies bands
- (6) Security Simulation of Cryptographic Module in Side-Channel Attack
- (7) Power Distribution Network (PDN) Modeling of the Perforated Planes in A Silicon Interposer for High Bandwidth Memory (HBM)
- (8) Investigation of CAN transceiver and controller response to electromagnetic disturbance by using current injection probe
- (9) A Novel Eye-Diagram Estimation Method for Pulse Amplitude Modulation with N-level on Stacked Through Silicon Vias
- (10) Electromagnetic radiation by IC chip and evaluation of mobile communication interference
- (11) Fundamental Study on Degradation of Randomness in TRNG Due to Intentional Electromagnetic Interference
- (12) High-Frequency Equivalent Circuit Model for High-Density Through-Silicon-Via
- (13) A Specification Method of Faulty Bytes in Cryptographic Module Using EM Information Leakage
- (14) Design and Analysis of EMI Shielding Method using Intermediate Coil for Train WPT System
- (15) Suppression Method of Near Magnetic Field Leaking from Ventilation Holes of Metallic Enclosure
- (16) Design and Analysis of Receiver Channels of Glass Interposers for 5G Small Cell Front End Module
- (17) Analysis of Undesired Emission from Microstrip Line with Ground Slot Using Transmission Line Method
- (18) Noise Coupling Path Analysis of RF Interference in a Vehicular Electronic System
- (19) Numerical Simulation of Abdominal Fat Measurement by Through-hole Wave Guide with Realistic Voxel Model
- (20) An Electromagnetic Field Reduction Method for Inductive Power Transfer in Transportation System
- (21) Study on Estimation of Sensing Timing Based on Observation of EM Radiation from Ultrasonic Range Finder
- (22) Ground Integrity Analysis in an On-chip Low-Dropout Regulator to PCB Hierarchical Power Distribution Network



- (23) EM Shielding Effectiveness of Artificial Designed Materials from Microwave to Millimeter-wave Band
- (24) Influence of IEMI Considering Injected Signal Phase on Faulty Outputs in a Cryptographic Module
- (25) Signal Integrity Analysis for High-speed Memory Test Interface using Data Capture PCB
- (26) Investigation on Improving Frequency Range of BAN (Broadband Artificial Network) for Immunity Evaluation of an In-vehicle System
- (27) Detecting Electromagnetic Analysis Attacks Using the Distribution of Electromagnetic Noise
- (28) Design, Analysis and Implementation of Smartwatch Strap Wireless Power Transfer System using Flexible Coil and Shielding Materials
- (29) Estimation of discharge current using a shielded loop probe caused by micro-gap ESD in spherical electrode
- (30) Fundamental Study on Reproducibility of Faulty Outputs from Cryptographic Module Using TEM Cell
- (31) Statistical Eye-diagram Estimation Method Considering Power/Ground Noise Generated by Simultaneous Switching Output Buffers
- (32) Evaluation and compensation of common mode voltage induced on the differential voltage probe in floating measurement of high voltage power electronics circuit
- (33) Magnetic Powder Composite Noise Suppressor to be Embedded in IC Chip Interposer
- (34) Magnetic Field Shielding Effectiveness Measurement and Comparative Analysis of Package Level Shielding Materials
- (35) A study on common and differential mode separation for conducted disturbance measured with DP-LISN
- (36) Quasi-distributed constant line filter mounted on actual equipment: Relationship between conductive noise suppression effect and parasitic capacitance of substrate
- (37) Radiated emission measurements for heavy-duty WPT EV systems – *In situ* measurements of Heavy-duty and High Power in CISPR/B –

### 3. Attendees

Table 2 summarizes the number of attendees in technical sessions from the both countries. The total number of participants is 86 for two-day workshop. We took a photo of attendees at the end of workshop dinner held in the first day (Fig. 2).



Fig. 2 Workshop attendees.

Table 2 Attendees of EMCJ-WS 2018.

Korea	45	KAIST	43
		ETRI	1
		KATECH	1
Japan	41	Tohoku Univ.	4
		NAIST	4
		Okayama Univ.	4
		Tohoku-Gakuin Univ.	4
		Nagoya Inst. of Tech.	3
		Univ. of Hyogo	3
		Kyutech	3
		Kobe Univ.	3
		Osaka University	3
		Tokyo Inst. of Tech.	2
		DENSO	2
		Akita Pref. Univ.	2
		Kyoto Univ.	1
		Tokin EMC Engineering Co., Ltd.	1
Central Research Institute of Electric Power Industry	1		
TOKIN Corporation	1		

### 4. International Exchange

A technical visit to the National Fab Center and laboratories of KAIST was arranged in the afternoon of the 2<sup>nd</sup> day of the workshop. Professors and staffs of the laboratories kindly gave explanations of their researches. In the evening of the 1<sup>st</sup> day of the workshop, the attendees enjoyed a traditional Korean dinner at the event hall located in the top floor of the main library of KAIST. We also enjoyed lunches at a restaurant of the campus. In the dinner and the lunch, the attendees from Korea and Japan had good opportunity to develop their friendships and to exchange their knowledges and experiences on researches and general things each other.

### 5. Conclusion

The 4<sup>th</sup> international joint workshop of IEICE EMCJ (EMCJ-WS 2018 Daejeon) was held in Daejeon for two days on November 2018. It has 37 technical presentations and more than 80 attendees, and finished in great success. The organizing committee would like to express great appreciation for all the speakers and the attendees of the workshop. We also would like to express great appreciation for the staffs involved in the workshop, who gave their generous efforts for the workshop.

The annual international joint workshop of IEICE EMCJ is skipped in 2019 as EMC Sapporo & APEMC 2019 will be held in Sapporo, Hokkaido, Japan on June 2019 [2]. We expect the next EMC joint workshop on 2020 in an Asian country.

### 6. References

- [1] <http://www.ieice.org/cs/emcj/jpn/regular/emcj-ws.html>
- [2] <http://www.ieice.org/~emc2019/>

## Report on the 2018 NS English Session Awards and Award Ceremony

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<sup>†</sup>Chair, <sup>††</sup>Vice Chair, <sup>†††</sup>Secretary, <sup>††††</sup>Assistant Secretary

### 1. Introduction

In the 2018 IEICE General Conference that was held on 20-23 March 2018, the IEICE Technical Committee on Network Systems (NS) provided the complete English Symposium Session entitled “Innovative Information Communication Technologies for Future Network System Supporting Information-oriented Industry.” In this session, 38 papers were presented at a single track during whole of the 4-days conference period [1], and the total number of participants was 120.

The NS committee selected recipients of NS English Session Award among the 38 papers. The recipients won the award at an award ceremony and presented the progress of their awarded papers as an invited lecture at the NS technical meeting in October 2018.

### 2. Award Ceremony

The award ceremony was held in the NS technical meeting at Kyoto city, Kyoto Prefecture on 18 October 2018, and 45 participants attended the ceremony. Three distinguished papers won the NS English Session Award, and all the recipients received an award certificate and a plaque from NS technical committee chair (Fig. 1).

(For the past recipients, please see our English home page. URL: <http://www.ieice.org/cs/ns/eng/index.html>)

### 3. English Session Awards 2018

The abstracts of the three papers that won the 2018 NS English Session Award are as follows.

#### “Global Optimization for Virtual Resource Management” [2]

We envision a global optimum virtual network resource management scheme consisting of three tasks: a) proper estimation of resource demands by virtual network operators (VNOs), b) optimum amount of resource allocation in response by infrastructure provider (InP), and c) improving resource availability and utilization for future unknown demands by creating a pool of unused but leased resources through InP-VNOs negotiation.

We consider a usage scenario for task a, where several entrant VNOs simultaneously compete in the



Fig. 1 English session award recipients. (Dr. Abu: Top left [2], Dr. Nunome: Top right [3], and Mr. Shao: Bottom left [4]), with chair (Okazaki) and secretary (Tanigawa): Bottom right.

market to offer the same type of IoT service (e.g. video surveillance) with various QoS to end users (EUs) and InP offers ephemeral network slices in a package to entrant VNOs. We have proposed a Bayesian game of incomplete information with Cournot oligopoly model to estimate the optimal initial resource demands for N entrant VNOs. Due to this initial estimation of resources, VNOs can avoid non-profit situations as well as resource underutilization. We then derived the Bayesian Nash Equilibrium (BNE) solutions.

We propose a multi-target classification based automatic NE allocation scheme (MTCRS) to be used by InP, for task b, to predict and allocate a multiple QoS compliant set of network elements for each VNO request. MTCRS satisfies three objectives for InP (namely balancing resource utilization, minimizing energy consumption, and avoiding over-allocation) by considering four QoS metrics for VNOs (provable QoS satisfaction guarantee, response time, location, and price).

During peak demands, when available resources are not sufficient, an InP and its customers (VNOs) can be mutually benefitted if they participate in a negotiation process to create a pool of leased but unused resources (task c). We model such negotiation process by using a

repeated game. InP offers VNOs compensation for returning unused leased resources, with the objective of creating the mentioned pool of resources to allocate to new VNOs when resource requests arrive from them.

#### “Application-Level QoS of H.264 Video and Audio IP Transmission with MMT AL-FEC and Error Concealment” [3]

As an application-level communication protocol for video transmission, MMT (MPEG Media Transport) has been standardized. In MMT, we can employ AL-FEC (Application Level Forward Error Correction) for recovering from errors and packet losses over the networks.

On the other hand, for mitigating the deterioration by the errors and packet losses, video error concealment can be used. The mechanism interpolates lost image regions from other information such as neighbor regions or previously output frames.

It has not been clarified the effect of the combination of AL-FEC and error concealment on video streaming QoE (Quality of Experience). Thus, in the first step, this paper assesses the joint effect of AL-FEC in MMT and the video error concealment mechanism in H.264/AVC on the application-level QoS (Quality of Service) by an experiment. The application-level QoS is closely related to QoE.

In the experiment, we employ two contents, two types of the number of slices per picture frame, and two types of the total bitrate of video and its FEC code. We perform the experiment under three load conditions. We assess the MU (Media Unit) loss ratio, the slice loss ratio, and PSNR (Peak Signal-to-Noise Ratio). We then compare FEC schemes with three code rate values (1/2, 2/3, and 5/6) and no FEC scheme.

As a result, we found that the appropriate code rate is important to enhance QoS. We also noticed that the effect of error concealment and FEC is different between contents.

#### “A Study of Internet Traffic Classification Based on Naïve Bayesian Method” [4]

In 5G networks, security issues are still important problems need to be solved because they have to offer very low latency by processing huge amount of traffic. High speed flow of huge volume of data poses great challenges to the intrusion detection and network monitoring functions. To reduce the computational and storage overhead of network monitoring, related works have proposed several methods, such as elephant flows identification, high-rate flows identification, super spreader flow identification, and small flow identification. Among these methods, hierarchical heavy hitter (HHH) is an effective method in network monitoring and intrusion detection.

This paper proposes a simple method that introduces a pre-process system before the HHH model by using Naïve Bayes algorithm. The incoming real-time traffic is used as the input of Naïve Bayes algorithm to obtain a set of datasets as output of pre-process system. The output is the classification of each traffic flow. By

using the classification output of the pre-process system as the input to HHH module, HHH module can perform classifications with the highest frequency of occurrence. With this classification, the classifier can determine whether it is a heavy hitter and trace to specific traffic.

We also consider to use not only Naïve Bayes algorithm in our pre-process system, but also other machine learning algorithms. Naïve Bayes algorithm is suitable for those classification problems in which categories of inputs are conditional independent from each other. In other words, the performance of Naïve Bayes is vulnerable to categories of inputs. In our experiment, we expect to solve this problem by adding machine learning algorithm before Naïve Bayes algorithm to combine them into a whole algorithm in our pre-process system in order to improve the accuracy of existing pre-process system and reduce the usage of memories.

#### 4. Future Plans

In the 2019 IEICE General Conference at Waseda University, the English Session entitled “Compositive Information Communication Technologies and Applications for Future Network System” will be held on 19-22 March. Many interesting studies on “network” and “service” including “wireless” and “optical” will be presented. Please attend the IEICE General Conference and enjoy the NS English session during the four days.

#### 5. Acknowledgements

We would like to give special thanks to Prof. Yoshiaki Tanaka due to his great contributions.

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- [2] A. H. A. Muktadir, T. Miyazawa, P. M.-Julia, V. P. Kafle, and H. Harai, “Global Optimization for Virtual Resource Management,” *IEICE General Conference*, BS-2-21, March 2018.
- [3] T. Nunome, “Application-Level QoS of H.264 Video and Audio IP Transmission with MMT AL-FEC and Error Concealment,” *IEICE General Conference*, BS-2-34, March 2018.
- [4] Y. Shao and V. P. Kafle, “A Study of Internet Traffic Classification Based on Naïve Bayesian Method,” *IEICE General Conference*, BS-2-35, March 2018.



# Report on 2018 Asian Wireless Power Transfer Workshop (AWPT2018)

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## 1. Introduction

The 2018 Asian Wireless Power Transfer Workshop (AWPT2018) was successfully held at Science Campus Hall, School of Engineering, Tohoku University, Sendai, Japan from Nov. 2<sup>nd</sup> to 4<sup>th</sup>. The AWPT2018 was organized by the Technical Committee on Wireless Power Transfer of IEICE Communication Society, technically co-sponsored by the Research Institute of Electrical Communication of Tohoku University, School of Engineering, Tohoku University, and financially supported by the Sendai Tourism, Convention and International Association.

## 2. AWPT Histories

This was the 4<sup>th</sup> workshop annually planned by the Technical Committee on Wireless Power Transfer of IEICE Communication Society. The AWPT aims to provide a platform for researchers to share the latest research and development progresses on the wireless power transfer technology, and also aims to promote exchanges and cooperation among the researchers in this technical field. The 1<sup>st</sup> AWPT was held in 2015 at Tamkang University, Taipei, Taiwan and the 2<sup>nd</sup> AWPT was held in 2016 at the University of Electronic Science and Technology of China (UESTC), Chengdu, China. The 3<sup>rd</sup> AWPT was held in 2017 at the National University of Singapore (NUS), Singapore. The AWPT will be held once a year around the Asian countries in the future. The next AWPT is planned to be held in DUYN TAN University, Da Nang City, Viet Nam.

## 3. Committee Members

Prof. Qiang Chen with Tohoku University and Prof. Masaharu Takahashi with Chiba University served as general co-chairs of the AWPT2018. Prof. Tsunayuki Yamamoto with Yamaguchi University served as a technical program committee chair. Prof. Kenjiro Nishikawa with Kagoshima University served as an award committee chair. Prof. Takashi Hikage with Hokkaido University and Prof. Hiroyasu Sato with Tohoku University served as finance committee chairs. Dr. Masahiro Hanazawa with UL Japan and Prof. Nozomi Haga with Gunma University served as publicity chairs. Prof. Keisuke Konno and Prof. Mizuki Motoyoshi with Tohoku University served as local arrangement chairs. Ms. Yumiko Ito with Tohoku University served as a secretary.

Prof. Naoki Shinohara with Kyoto University and Prof. Qiaowei Yuan with National Institute of

Technology, Sendai College served as international advisory committee chairs. Nine distinguished professors from eight countries served as the international advisory committee members.

## 4. Workshop Overview

The AWPT2018 focused on following technical areas.

- Wireless power transfer and energy harvesting
- Wireless power transmitters and receivers
- Integrated circuits and systems
- Applications of wireless power transfer
- Other device, system or application topics

Finally, 49 papers including two keynote talks, six invited talks, 21 oral presentations and 20 interactive presentations were accepted.

Two keynote talks are as follows.

- Wireless Power Transfer: Theory and Technology, Prof. Hidetoshi Matsuki with Tohoku University, Japan
- Wireless Power Transfer—Towards a Three-dimensional Transmission, Prof. Zhizhang (David) Chen with UESTC and Dalhousie Univ., Canada

Technical level and quality of the presented papers were high. Owing to extensive efforts of speakers and attendees, technically fruitful discussions were available and total attendees of the AWPT2018 were 100.

Excellent oral and interactive presentations given by students were awarded. Three papers were awarded as AWPT 2018 Best Student Award and eight papers were awarded as AWPT 2018 Student Award. All awarded papers are as follows.

-Best Student Award-

- Study on Electrically Coupled WPT System Inspired by Disk Repeater for Horizontally Moving Objects, Kohei Ohguro, Wataru Uemura with Ryukoku Univ, Ikuo Awai with Ryutech.
- Wireless Power Transfer for Moving Vehicle Using Collinear Array Antenna, Jun Deguchi, Hiroshi Hirayama with Nagoya Inst. of Tech.
- A Method of Focusing for Wireless Powering to In-Body Medical Device by Using Fresnel Zone Plate, Xianbo Cao with Xidian Univ., Hiroyasu Sato, Qiang Chen with Tohoku Univ., and Wen Jiang with Xidian Univ.

**-Student Award-**

- Ferrite's Effect on Wireless Power Transfer Efficiency Between Coils, Hiroshi Satake and Qiaowei Yuan with NIT, Sendai College.
- Resonator Design Support by Deriving Suboptimal Current Distribution for Magnetically Coupled Wireless Power Transfer, Misaki Fujishiro, Yoshiaki Narusue, Yoshihiro Kawahara, Hiroyuki Morikawa, with The Univ. of Tokyo.
- Magnetic Coupling Power Transfer  $k$ ,  $Q$ , and  $kQ$  of Various Length Primary Coils for a Battery-Less Mini 4WD, Shinji Abe, Naoki Sakai and Takashi Ohira with Toyohashi Univ. of Tech.
- A Novel Design of High Efficiency 5.8 GHz Rectifier in Dynamic Range by Using Short-End Transmission Line and Harmonic Terminal Network, NgocDuc Au and Chulhun Seo with Soongsil Univ.
- An Efficiency of Impedance Matching Approach with Lossy Elements in Wireless Power Transfer System, Satoshi Suzuki, Qiang Chen and Hiroyasu Sato with Tohoku Univ.
- Theoretical Analysis of the Simple Single Shunt Rectifier, Takashi Hirakawa and Naoki Shinohara with Kyoto Univ.
- Numerical Estimation of Indoor Propagation Characteristics for Microwave Wireless Power Transfer, Tetsuya Sekiguchi, Masakazu Yamagishi, Takashi Hikage, Keita Sakakibara and Toshio Nojima with Hokkaido Univ.
- Capsule localization method corresponding to both polarized waves for wireless power transmission, Daijiro Hiyoshi and Masaharu Takahashi with Chiba Univ.

**5. Conclusion**

On behalf of the organizing committee of the AWPT 2018, I deeply appreciate to all speakers and attendees of the workshop. I believe that the AWPT2018 was a fruitful workshop.



Fig. 1 Attendees of AWPT2018.



Fig. 2 Oral Session.



Fig. 3 Interactive Forum.



Fig. 4 Banquet.



Fig. 5 Award Ceremony.



# Report on the 32<sup>nd</sup> Optical Communication Systems Symposium “Toward the realization of Society 5.0: the role of optical communication in super smart society”

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<sup>†</sup>NTT, <sup>‡</sup>Furukawa Electric Co., Ltd.



## 1. Introduction

The 32<sup>nd</sup> Optical Communication Systems (OCS) Symposium, sponsored by the IEICE Technical Committee on OCS, was held on Dec. 18–19, 2018 at the Toray Human Resources Development Center in Mishima City, Shizuoka, Japan. The subtitle of this year’s symposium was “Toward the realization of Society 5.0: the role of optical communication in super smart society,” which was proposed to motivate optical communication engineers to discuss how they can contribute to realize the vision of Society 5.0. The number of participants was 167, and 20 exhibitors also participated in the symposium. It was organized in cooperation with the IEEE Photonics Society Japan Chapter, the Photonic Internet Forum (PIF), and the IEICE Technical Committee on Extremely Advanced Optical Transmission Technologies (EXAT).

## 2. Technical Sessions

After the welcome address by Dr. Itsuro Morita, the IEICE OCS committee chair, presenting an overview of recent activities and future plans of the OCS technical committee, the Day 1 (Dec. 18) started with a workshop entitled “What is Society 5.0?: the society and applications to be realized.” It consisted of the following four invited talks (Fig. 1): ICT applications in local governments and regional invigoration by Ms. Akimi Yamazaki (Aizuwakamatsu City), innovation in regional industry with 5G by Mr. Takuya Kamei (Nomura Research Institute), construction of map data with 3D-LiDAR by Mr. Takeshi Kohda (Pioneer), and V2X communication systems for self-driving vehicles by Prof. Kei Sakaguchi (Tokyo Institute of Technology). These presentations offered great opportunities for researchers to look ahead the evolution toward future smart society and the required



Fig. 1 Presenters of Workshop 1: from left, Ms. A. Yamazaki, Mr. T. Kamei, Mr. T. Kohda, and Prof. K. Sakaguchi.

role of optical communication technologies. After the workshop, we had a poster session, where 20 posters were presented by young researchers and the award winners (Fig. 2).



Fig. 2 Snapshot at poster session.

In the evening of Day 1 and the morning of Day 2 (Dec. 19), invited lectures in optics and photonics fields were organized (Fig. 3). The first lecture was entitled “Trend of mobile fronthaul and backhaul technologies toward the era of beyond 5G” given by Dr. Kosuke Nishimura (KDDI Research). He gave us an overview on mobile access networks in 5G and beyond, and presented recent progress in Radio over Fiber (RoF) technologies with the aim of accommodating high-capacity wireless traffic efficiently. The second lecture, which was organized by IEEE Photonics Society Japan Chapter, was given by Dr. Hiroki Takesue (NTT, an IEEE Distinguished Lecturer) and entitled “Coherent Ising machine: An Ising-model solver based on degenerate optical parametric oscillators.” The lecture covered the principle of an Ising machine and its novel implementation with photonic circuits for ultra-large-scale computing. The third was entitled “Progress in distributed optical fiber measurement for smart society beyond optical communication,” which was presented by Dr. Kinzo Kishida (Neubrex). He described the fundamental of fiber sensing and how it can play an



Fig. 3 Invited lecturers: from left, Dr. K. Nishimura, Dr. H. Takesue, Dr. K. Kishida, and Mr. Y. Inada.



important role as a monitoring system in smart society. The final lecture was given by Mr. Yoshihisa Inada (NEC) with the title of “Technological trend in optical submarine cable system.” He reviewed latest technologies that have been introduced in transoceanic systems toward further increase in capacity, flexibility, cost and power efficiency by means of novel shaping, coding and multi-core fibers. He also talked about the concept of “Open cable” and the standardization progress in ITU-T.

The latter half of the morning session was devoted to a keynote speech by Dr. Kazuo Kyuma (National Agriculture and Food Research Organization) on “Toward future economic society 5.0: expectation to IEICE” (Fig. 4). His talk started from the concept and target of Society 5.0, whose vision was originally designed under his leadership as a government policy. He then described recent government programs for developing the fundamental framework of Society 5.0, with a special focus on ongoing projects in the area of food and agriculture. Finally, he expressed great expectation to the community of IEICE with warm encouragement toward the establishment of Society 5.0.



Fig. 4 Keynote speech by Dr. K. Kyuma.

In the afternoon session, we had another workshop featuring the latest research trend in optical communication technology. Invited talks were given by Dr. Takayuki Mizuno (NTT) on space division multiplexing, Mr. Tomoo Takahara (Fujitsu Laboratories) on short-reach high-speed transmission, Dr. Hideki Yagi (Sumitomo Electric) on InP monolithic integrated coherent devices, and Mr. Masanori Miyazawa (KDDI Research) on network operation based on AI and machine learning. The workshop focused a spotlight on the research forefront of optical communication and convinced attendees the continuous progress of this field.



Fig. 5 Presenters of Workshop 2: from left, Dr. T. Mizuno, Mr. T. Takahara, Dr. H. Yagi, and Mr. M. Miyazawa.

### 3. Rump Session

In the evening of Day 1, we organized a rump session with a topic of “What comes next after Society 5.0?” (Fig. 6), hosted by Prof. Hiroyuki Uenohara

(Tokyo Institute of Technology). After watching short video clips to get a basic idea on Society 5.0 and initiate the discussion, the attendees had a round-table informal discussion about futuristic services, applications, and enabling technologies that we can expect to go beyond Society 5.0. It offered a unique opportunity for participants to think out of the box and stimulate futuristic imagination.



Fig. 6 Snapshot at rump session.

### 4. Award Ceremony

During the technical sessions, we celebrated this year’s OCS award winners at the award ceremony (Fig. 7). The OCS Technical Committee presented the awards to the following this year’s winners:

- OCS Best Paper Award: Prof. Akihiro Maruta and Mr. Takato Zuiki (Osaka University) for “Generation of hyper multi-value modulated signal based on optical eigenvalue multiplexing”
- OCS Young Researchers Award: Ms. Yuki Saito (Sumitomo Electric) for “Physical-contact 256-core MPO connector with flat polished multi-core fibers”
- OCS Young Researchers Award: Dr. Katsuyoshi Sakaime (Chiba Institute of Technology) for “Ferrule endface analysis of PC connection using MDCF connector”
- OCS Young Researchers Award: Mr. Tomoki Nishiyama (Osaka University) for “Optical coherent receivers with feedback-control-free adaptive equalization based on dual-polarization pilot tones”



Fig. 7 OCS award-winners: from left, Prof. K. Igarashi (on behalf of Mr. T. Nishiyama), Dr. K. Sakaime, Dr. I. Morita (presenter), Ms. Y. Saito, and Prof. A. Maruta.

### 5. Conclusion

We hope that the participants enjoyed the stimulating presentations and discussions on the future of our smart society and gained a new insight into optical communication as a backbone infrastructure in Society 5.0. Finally, the OCS technical committee would like to thank the speakers, participants, and exhibitors, for their invaluable contributions.

# Report on the 14<sup>th</sup> International Conference on Space, Aeronautical and Navigational Electronics 2018 (ICSANE 2018)

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<sup>†</sup>Electronic Navigation Research Institute (ENRI),

<sup>††</sup>Nagasaki University, <sup>†††</sup>National Institute of Information  
and Communications Technology (NICT)



## 1. Introduction

The 14<sup>th</sup> International Conference on Space, Aeronautical and Navigational Electronics (ICSANE 2018) was held at Aviation Hotel, Xuchang, Henan, China on November 7<sup>th</sup> - 9<sup>th</sup>, 2018. This conference was organized by the Technical Group on Space, Aeronautical and Navigational Electronics (SANE) of the Institute of Electronics, Information and Communication Engineers (IEICE) and Xuchang University, and was supported by IEEE AESS Japan Chapter, IEEE GRSS Japan Chapter, Japan Aerospace Exploration Agency (JAXA), and Electronic Navigation Research Institute (ENRI). Two international, peer-reviewed open access journals in MDPI, Remote Sensing and Electronics, became a media partner of the conference. In this report, we describe the objective and summary of ICSANE 2018.

## 2. Objective of Conference

The first ICSANE (former name is Workshop on Space, Aeronautical and Navigational Electronics (WSANE)) was held in Daejeon, Korea, 2005. After that, ICSANE takes place every year in Asia-Pacific region. ICSANE aims at providing an opportunity for system engineers and researchers to discuss new and viable technical topics of electronics system in spacecraft, aircraft, ships and ground facilities. The ICSANE 2018 covered the following topics:

- (1) Satellite and space-station systems
- (2) Remote sensing and scientific observation technology
- (3) Radar systems and applications
- (4) Navigational and communication systems
- (5) Inver scattering

## 3. Organizing Committee

The steering committee of ICSANE 2018 was strongly led by General Chair and General Co-Chair, and supported by Co-Chairs of Organizing Committee. The other organization is technical program committee. These main committee members are listed as the followings.

### ● Steering Committee:

General Chair:

Jihong Zhao (President, Xuchang Univ., China)

General Co-Chair:

Sonosuke Fukushima (ENRI, Japan)

### ● Organizing Committee:

Co-Chairs:

Zhi Zheng (Xuchang Univ., China)

Hirokazu Kobayashi (OIT, Japan)

Members:

Zhi-Li Zhang (Xuchang Univ., China)

Guo-Xi Wu (Xuchang Univ., China)

Gen-Yuan Du (Xuchang Univ., China)

Akitsugu Nadai (NICT, Japan)

Atsushi Kezuka (ENRI, Japan)

Manabu Akita (UEC, Japan)

Takeshi Amishima (MELCO, Japan)

Masato Yamanashi (MSS, Japan)

### ● Technical Committee:

Chairs:

Kun-Shan Chen (Xuchang Univ., China)

Jian Yang (Tsinghua Univ., China)

Toshifumi Moriyama (Nagasaki Univ., Japan)

Members:

Yang Du (Zhejiang Univ., China)

Fang Yang (Tsinghua Univ., China)

Hongchen Yin (BIEC, China)

Junjun Yin (USTB, China)

Lixin Wu (Central South Univ., China)

Hiroyoshi Yamada (Niigata Univ., Japan)

Shouhei Kidera (UEC, Japan)

Takahide Mizuno (JAXA, Japan)

Shunichi Futatsumori (ENRI, Japan)

## 4. Program and Activities

At the opening ceremony of ICSANE 2018, Deputy Secretary of Xuchang city, Ms. Li Shaoying delivered her warmly welcome address and expressed the importance of international academic exchange in Xuchang City for understanding and making progress in the areas of the aerospace, aviation and remote sensing. President of Xuchang University, Jihong Zhao welcome the international and national participants to this wonderful event that hosted by Xuchang





(a)



(b)

Fig. 1 Opening ceremony of ICSANE 2018.

University under the lead by Prof. Kun-Shan Chen and his team. Next, Dr. Sonosuke Fukushima, who is a chair of SANE, IEICE, expressed his thanks and talked about SANE and ICSANE history. The photos of opening ceremony are shown in Fig.1.

ICSANE 2018 had two keynote speeches. First is “Remote Sensing: A 3<sup>rd</sup> Eye for 4<sup>th</sup> Industrial Revolution” presented by Prof. Chuah Hean Teik, President, University Tunku Abdul Rahman, Malaysia, and second is “Intelligent Processing of Hyperspectral Remote Sensing Image” presented by Prof. Mingyi He, Northwestern Polytechnical University, China. In addition, we had one special session entitled “Honor Memory of late Prof. Wolfgang-Martin Boerner.” On 25 May 2018, Prof. Wolfgang-Martin Boerner, a Professor Emeritus of the University of Illinois at Chicago, an IEICE Fellow, passed away. To express our sincere gratitude and appreciation for Prof. Boerner’s outstanding achievements and extraordinary contributions to radar remote sensing and IEICE, we hold the special session. Prof. Yoshio Yamaguchi, Niigata University, Prof. Leung Tsang, University of Michigan, Prof. Jian Yang, Tsinghua University, Prof. Sang-Eun Park, Sejong University and other 7 speakers provided their talks in this special session. Figures 2 - 4 are keynote speakers and special talk speaker.

The technical program of ICSANE 2018 consisted of 8 oral sessions. The 38 papers in regular sessions were presented. The papers covered the variety technologies which are satellite, aircraft navigation, radar signal processing, synthetic aperture radar (SAR), remote



Fig. 2 Keynote speaker: Prof. Chuah Hean Teik.



Fig. 3 Keynote speaker: Prof. Mingyi He.



Fig. 4 Prof. Yoshio Yamaguchi in special session entitled “Honor Memory of late Prof. Wolfgang-Martin Boerner.”

sensing, etc. Total number of participants reached around 70 from seven countries: Japan, China, Taiwan, Malaysia, Korea, Vietnam and USA. In the third day afternoon, a cultural tour to Xuchang city was conducted. Figure 5 is the group photo of ICSANE 2018.

### 5. Award Ceremony

In the night of second day, an award banquet was held at Aviation Hotel. We celebrated the winners of young scientist award. Prof. Kun-Shan Chen, Prof. Jian Yang and Prof. Hirokazu Kobayashi presented a testimonial to each award recipient. The winners are as follows:





Fig. 5 Group photo of ICSANE 2018.

Winners of Young Scientist Award:

- Mr. Maito Umemura (Niigata University, Japan): Model-Based Target Classification Using Polarimetric Similarity with Coherency Matrix Elements
- Mr. Kan Jin (Tsinghua University, China): A Novel Method Using Convolutional Neural Network for Polarimetric SAR ship Detection
- Mr. Zhen Xu (Institute of Remote Sensing and Digital Earth, CAS, China): Effects of Lunar Revolution on the Performance of the Moon-Based Synthetic Aperture Radar

Winners of Encouragement Award:

- Shun-ichi Takaoka (National Taipei University of Technology, Taiwan): Thinning Technique in Cylindrical Scanning Measurement for RCS Near-field to Far-field Transformation
- Rin Nakamura (The University of Electro-Communications, Japan): A Parametric Estimation Method for Detecting Aircraft Wake Turbulence Using a Single Doppler LIDAR

Winner of Student Expense Grants:

- Bui Thi Ha (Vietnam National University, Vietnam): Research, Design and Fabrication Microwave Modules of Receiver for Nanosatellite at S band

In addition, the SANE committee offered the letters of appreciation to Prof. Jihong Zhao (President, Xuchang Univ., China), Prof. Kun-Shan Chen (Xuchang Univ., China) and Prof. Jian Yang (Tsinghua Univ., China) for outstanding contributions to ICSANE 2018.

## 6. Conclusions

ICSANE 2018 was successfully held in Xuchang, China. We hope that all the participants in this conference enjoyed the presentation and discussions on the future trends and the latest advances of research and development on Space, Aeronautical and Navigational Electronics.

## 7. Acknowledgements

Prof. Jihong Zhao (President, Xuchang Univ., China), Prof. Kun-Shan Chen (Xuchang Univ., China) and the students of Xuchang University are highly appreciated for their efforts and passion to arrange ICSANE 2018.



(a) Prof. Jian Yang (presenter) and Mr. Maito Umemura.



(b) Prof. Kun-Shan Chen (presenter) and Mr. Kan Jin.



(c) Prof. Hirokazu Kobayashi (presenter) and Mr. Zhen Xu.

Fig. 6 Young scientist award-winners.

# Report on a Japan-Korea Joint Conference on Satellite Communication (JC-SAT 2018)

Takashi Takahashi<sup>†</sup> and Hiroki Shibayama<sup>††</sup>  
<sup>†</sup>NICT, <sup>††</sup>NTT Corporation



## 1. Overview

This article reports on the Japan-Korea Joint Conference on Satellite Communication (JC-SAT) that was held at Korea Aerospace Research Institute (KARI), Daejeon, Korea, on October 11<sup>th</sup> and 12<sup>th</sup> (Fig. 1).



Fig. 1 Conference place, Korea Aerospace Research Institute, Korea.

This conference was jointly organized by Technical Committee on Satellite Communications of IEICE and Korean Society of Space Technology (KOSST) in Korea and sponsored by IEEE VTS Japan Chapter.

JC-SAT intends to provide a forum for researchers in satellite communications and applications field to discuss the current status, technical challenges, standards, fundamental issues and future services. This conference will cover technologies and system implementations of satellite communications and applications as they related to the areas of satellite services including GNSS.

## 2. Report on Sessions

The technical program of JC-SAT 2018 consisted of 6 sessions where 20 general papers and 4 special papers were presented. Total number of registered participants reached 75 including 11 from Japan and 64 from Korea.

The presented papers covered a wide range of unique and novel technical topics on Satellite communication. On the first day of the workshop, 2 sessions were held. Opening remark was conducted by Dr. Ki-kuen Kim, a

chairman of organizing committee of JC-SAT 2018 (Fig. 2).

The special talk, “Overcoming Extreme Space Environments Using On-board Processing (OBP) and Software-Defined Networking (SDN)” was presented by Dr. Jihwan P. Choi (Fig. 3).



Fig. 2 Opening remarks presented by Dr. Ki-kuen Kim, a chairman of organizing committee of JC-SAT 2018.



Fig. 3 Special talk presented by Dr. Jihwan P. Choi.

On the second day, 4 general sessions were held including 3 special talk. “Overview of 8K UHD TV Satellite Broadcasting” by Mr. Hisashi Sujikai, “Future perspective of new business using satellite” by Mr.

Tasuku Nagoya, and “Development of remote island/disaster-relief satellite communication systems” by Dr. Fumihito Yamashita.

Closing remark was conducted by Dr. Hiroyuki Tsuji of JC-SAT 2018 was presented (Fig. 4).



Fig. 4 Closing remark conducted by Dr. Hiroyuki Tsuji, co-chairman of JC-SAT 2018 Technical Committee.

### 3. JC-SAT Award Ceremony

The JC-SAT 2018 presented the Best Paper Award (JC-SAT Award) to the authors of the selected outstanding papers at the reception to be held at the first day.

Both KOSST and IEICE select one award-candidate paper from the papers submitted to, reviewed by each organization, disclose the papers each other, discuss the review results of award candidate papers and mutually agree to the selection, which is a mandatory condition for award authorization.

On the first day of JC-SAT 2018, the award was announced and presented to the paper authors (Fig. 5, 6).

Through the above procedure, the following two papers were honored as JC-SAT Award and award certificates and extra prize had been handed from Dr. Hisanori Tsuji during JC-SAT Award ceremony on the first day.

1. Young-bin Kim and Kosuke Yamazaki, “UAV-enabled Opportunistic Relaying Schemes Based on Non-orthogonal Multiple Access in Correlated Rician Fading Channels”
2. Changhyeong Lee, Hheejun Park, Gwang-gyun Namgung, Jinyoung Kwon and Sungtek Kahng, “Flat Beamforming Antennas Units Expandable to Sub-Arrays”



Fig. 5 JC-SAT Award awarded to “UAV-enabled Opportunistic Relaying Schemes Based on Non-Orthogonal Multiple Access in Correlated Rician Fading Channels.”

### 4. Conclusions

As reported, JC-SAT 2018 was finished with a great success (Fig. 7). In the steering committee meeting held in the afternoon on the day before the first day, it was decided that the next JC-SAT will be held on Japan on the begin October of 2019.



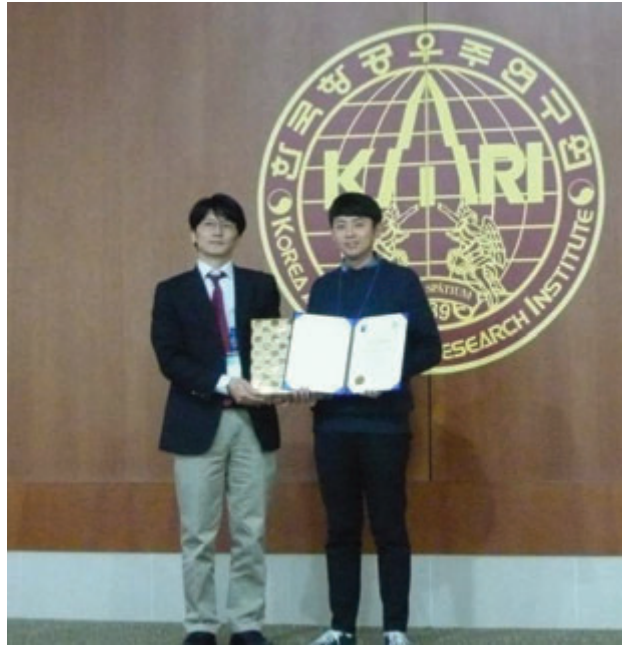


Fig. 6 JC-SAT Award awarded to “Flat Beamforming Antennas Units Expandable to Sub-Arrays.”



Fig. 7 All participants on JC-SAT 2018 Daejeon Korea.

# Report on the 9<sup>th</sup> International Conference on ICT Convergence (ICTC 2018)

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## 1. Introduction

The 9<sup>th</sup> International Conference on Information and Communication Technology Convergence (ICTC 2018) was held in Maison Glad Jeju, Jeju Island, Korea from October 17<sup>th</sup> to 19<sup>th</sup>, 2018 [1]. ICTC is a leading, flagship international conference hosted by the Ministry of Science and ICT (MSIT) of Korean government, organized by the Korean Institute of Communications and Information Sciences (KICS) and technically co-sponsored by IEICE-CS and IEEE Communications Society. ICTC 2018 features an extremely rich program with the main theme of “ICT Convergence Powered by Smart Intelligence.” The conference addresses numerous challenges of ICT convergence over various industrial sectors, including wireless and mobile communication systems and infrastructure, future networks, services and applications, smart devices and consumer appliances, cloud computing, green communication, healthcare and bio-informatics, and Internet of Things (IoT).

## 2. Conference Program

The conference program includes plenary sessions, invited industrial sessions, technical paper sessions, and special sessions.

In two plenary sessions (Fig. 1), we had 5 keynote speeches. The Plenary Session I was started with the opening address by Prof. Chung G. Kang, (President of KICS), and a congratulatory address by Prof. Tomoaki Ohtsuki (Keio University, Japan) as the representative of IEICE-CS. Then, Dr. Kyungwhoon Cheun (Head of R&D, Networks Business, Samsung Electronics Co., Ltd, Korea) delivered a keynote speech on “5G is Reality: Transforming Lives and Industries” which was followed by another keynote speech on “Smart Healthcare” by Prof. Tomoaki Ohtsuki (Keio University, Japan). Plenary Session II consists of 3 keynote speeches. Prof. Zang-Hee Cho (Endowed Chair Professor & Director, Neuroscience Research Institute, Suwon University, Korea & Advanced Institutes of Convergence Technology, Seoul National University, Korea) delivered a keynote speech on “How Brain Science Can Help Artificial Intelligence or Information Technology?” and Prof. Joel J. P. C. Rodrigues (National Institute of Telecommunications, Brazil) delivered a keynote speech on “Trends and Challenges for Internet of Things.” Prof. Nikil Jayant



Fig. 1 Plenary Session.

(Emeritus Chaired Professor, Georgia Institute of Technology, USA & Adjunct Professor, University of California at Santa Barbara, USA) delivered the last keynote speech on “Quantifying Communications Quality: QoS, QoE and QoI.”

Each of two industrial sessions (Fig. 2) consists of 3 invited talks from industries. The theme of Industrial Session I was natural language understanding, IoT, and CybreBrain. Dr. Yu-Sung Chang (Senior Vice President of SK Telecom, Korea), Mr. Soumya Kanti Datta (Research Engineer of Eurecom), and Mr. O. K. Baek (Research Fellow of ETRI, Korea) gave excellent talks on the theme. In Industrial Session II, Dr. Richard Lixiaojun (Head of Huawei 5G E2E Solution Department, Korea & Japan), Dr. Bong Youl (Brian) Cho (Head of Radio Product Management for Asia Pacific and Japan, Mobile Networks, Nokia) and Dr. Youngjoon Kim (Head of Ericsson-LG R&D, Korea) gave interesting talks on 5G.

Regarding technical paper sessions (Fig. 3), 816 papers were submitted to the conference. After





Fig. 2 Industrial Session.



Fig. 3 Technical Session.

through review process, the technical program committee (TPC) accepted 383 papers, which were organized into 26 oral sessions and 2 poster sessions. The overall acceptance ratio was about 46.9%. The topics of technical paper sessions covered wireless and mobile communications, information and communication theory, future internet, smart media and broadcasting, green communication technologies, smart grid, u-healthcare and bio-infomatics, IoT, Machine-to-Machine (M2M), and encryption and security. In addition, 13 workshop sessions were provided and 6 special sessions were organized with 18 invited talks from academia and industries.

### 3. Social Events

At the first night, the welcome reception was held at the convention hall of hotel. The participants enjoyed the beverage and cookies talking together.

The conference banquet (Fig. 4) was held at the second night. The banquet began with a welcome address and introduction of OC members by Dr. Seung Ku Hwang (Organizing Committee Chair). Prof. Myungsik Yoo (TPC Chair) made a TPC report, including paper statistics and Best/Excellent Paper Award selection procedure. Then, a Symposia Program Committee (SPC) report was made by Prof. Hyukjoon Lee (SPC Chair). 2 Best Paper Awards and 4 Excellent Paper Awards were presented to the authors of six selected papers (Fig. 5). All participants enjoyed the banquet with nice Korean food and an exciting performance.



Fig. 4 Conference Banquet.



Fig. 5 Best/Excellent Paper Award.

### 4. Conclusion

Since 2010, ICTC has been the unique global premier event for researchers, industry professionals, and academics interested in the latest developments in the emerging industrial convergence centered on the ICT technologies. On behalf of OC and TPC, we would like to thank all the participants and sponsors who made ICTC 2018 a big success. It is our great pleasure to announce that the next event, ICTC 2019, will be held in Ramada Plaza Hotel, Jeju Island, Korea, during October 16-18, 2019 [2]. ICTC 2019 invites the submission of original research works in all areas of infrastructure, services, technologies, and application of ICT convergence.

### 5. References

- [1] <http://2018.ictc.org/>
- [2] <http://ictc.org/>



# Report on the International Conference on Photonics in Switching and Computing (PSC 2018)

Werner Klaus<sup>1</sup>, Ioannis Tomkos<sup>2</sup>, Dan M. Marom<sup>3</sup>

1: National Institute of Information and Communications Technology (NICT), Japan

2: Athens Information Technology (AIT) Center, Greece

3: Hebrew University of Jerusalem, Israel



## 1. Introduction

The international conference Photonics in Switching and Computing (PSC) 2018 [1] is the successor of the well-known conference Photonics in Switching (PS) which has been successfully running since 2001 and hosted annually in turn by Europe, Japan and North America. PSC 2018 was organized by the University of Cyprus and held in the city of Limassol on the beautiful island of Cyprus in Europe from 19<sup>th</sup> to 21<sup>st</sup> September 2018. The conference's technical co-sponsor was the IEEE, in particular its Photonics and Computer Societies.

## 2. Overview

PS has been traditionally one of the premier conferences to discuss the latest advancements on optical network architecture including network management and control as well as its subsystems down to individual optical components and devices. As optical communications is playing a crucial role for datacenter connectivity and high-performance computing, the incorporation of the “computing” aspect, giving rise to the renewed PSC, was received with enthusiasm by the conference participants and is expected to draw in new perspectives and open up new avenues for the conference in the future. As such, the conference's themes included this time also the field of Photonics in Computing Systems besides traditional topics such as Optical Switching Technology & Devices, Optical Switching Functions & Building Blocks, and Optical Networks & Communications Systems. PSC 2018 featured 3 Workshops, 4 Plenary Speakers, 3 Tutorials, 22 Invited Presentations, and numerous contributed papers distributed over 18 Technical Sessions running in three parallel tracks. The conference was well attended by more than 150 people coming from organizations located in 24 different countries, with about 20% from industry and 80% from academia.

## 3. Workshop Sessions

The first day of the conference was devoted to three specialized workshops discussing (a) Optical Data Center Interconnects, (b) Fast Switching Technologies

for Data Center Networks and (c) Space Division Multiplexed (SDM) Optical Transmission and Networking. The SDM workshop, chaired by Prof. Chigo Okonkwo from Eindhoven University of Technology and Dr. Ruben Luis from NICT, was also technically co-sponsored by EXAT (the Technical Committee on Extremely Advanced Optical Transmission Technologies) of Japan. In two sessions, twelve SDM experts from Japan, Europe, Israel and the US discussed from the morning until late afternoon emerging components, fibers and systems including the network and control plane aspects for future deployment of SDM in optical networks. The workshop was very well attended and gave all participants an excellent overview of the state-of-the-art in SDM technology both in terms of fiber devices and network design. The organizers and speakers of the SDM workshop are shown in Fig. 1.



Fig. 1 SDM workshop organizers and speakers (from left to right: Dr. Salvatore Spadaro, Dr. Yusuke Hirota, Dr. Haoshuo Chen, Dr. Itsuro Morita, Prof. Koji Igarashi, Dr. Takashi Sasaki, Prof. Chigo Okonkwo, Dr. Ioannis Tomkos, Dr. Christina Rottondi, Prof. Dan Marom, Dr. Werner Klaus, Dr. Nicolas Psaila, Dr. Ruben Luis, Prof. Luca Poti).

## 4. Plenary Sessions

In the selection of the Plenary Speakers, special emphasis was placed on the new “computing” aspect. As such, PSC 2018 featured four prominent speakers covering the wide-ranging aspects of photonics in future computing systems. Shortly after the opening ceremony shown in Fig. 2, which took place on the

evening of the first day, Dr. Mike Haney, program manager at Advanced Research Projects Agency-Energy (ARPA-E), described the Enlitened program he manages, and the different projects being investigated for introducing photonic technologies to data centers in effort to curb their rising power consumption.



Fig. 2 Opening ceremony.

On the morning of the second day of the conference, Dr. Cyriel Minkenberg (who, in the last minute, had to step in for Dr. Andrew Rickman, founder of Rockley Photonics) then shared his company's vision of bringing silicon photonics device, integrated circuit, and packaging technology as close as possible to the electronics switching ASICs, affording greater efficiency and link capacities by reducing electronic interconnect lengths. Furthermore, Dr. Ashok Krishnamoorthy, founder of Axalume, shared his insight on the power, density, and capacity advantages of photonic interconnects. And last but not least, Prof. Yoshihisa Yamamoto, working both at Stanford University and at the National Institute of Informatics (NII) in Tokyo, provided his futuristic views and efforts on quantum computing and simulation with photonics, as shown in Fig. 3.



Fig. 3 Prof. Yoshihisa Yamamoto speaking at the Plenary Session.

### 5. Best Paper Award

Two Best Paper Awards were awarded to the highest ranked papers in the review process which were submitted by two teams in Japan shown in Fig. 4. The

first was awarded to a team represented at the conference by Dr. Salah Ibrahim from NTT that developed a monolithically integrated optoelectronic parallel-to-serial converter for 100-Gbps optical packets [2]. The second one was the successful outcome of a collaboration between NICT and Fujikura Ltd. where the team, represented at the conference by Dr. Georg Rademacher, demonstrated transmission of 21 wavelength-division multiplexed 3-mode spatial superchannels each based on polarization-division multiplexed 256-quadrature-amplitude modulation over a 30 km long few-mode fiber [3].

### 6. Conclusion

PSC 2018 closed with great success. It got off to an incredible launch, which will be followed by PSC 2019 to be co-located with OECC (OptoElectronics and Communications Conference) in Fukuoka, Japan, July 7-11, 2019 [4]. We look forward to seeing the computing theme solidifying into the "photonics in switching" platform in 2019 and beyond.

### 7. References

- [1] <http://cyprusconferences.org/psc2018/index.html>
- [2] H. Ishikawa, S. Ibrahim, et al., "A Novel Optoelectronic Parallel-to-Serial Converter for 100-Gbps Optical Packets," Th3B.3, PSC 2018.
- [3] G. Rademacher et al., "Record Spectral Efficient Transmission of 11.24 Bit/s/Hz/mode over 30 km Few-Mode Fiber," Th3C.5, PSC 2018.
- [4] <https://www.oeccpsc2019.org/>



Fig. 4 Dr. Salah Ibrahim from NTT (top) and Dr. Georg Rademacher from NICT (bottom) receiving the Best Paper Award handed over by Prof. Dan Marom.

# Report on 2018 International Symposium on Antennas and Propagation (ISAP2018)

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## 1. ISAP2018

2018 International Symposium on Antennas and Propagation (ISAP2018) was held at Paradise Hotel, Busan, Korea, from October 23<sup>rd</sup> to 26<sup>th</sup>, 2018. This was the 11<sup>th</sup> ISAP outside Japan since the symposium started to be held in Asia-Pacific region every year. ISAP2018 was organized by Korean Institute of Electromagnetic Engineering and Science (KIEES), and was in cooperation with a lot of academic institutes not only in Asia-Pacific region, but also in USA and Europe. The IEICE Communications Society was also one of the technical co-sponsors for the symposium.

Prof. Jaehoon Choi (Hanyang Univ.) served as General Chair, and Prof. Kyeong-Sik Min (Korea Maritime and Ocean Univ.) served as Technical Program Committee (TPC) Chair.

The statistics for paper submission, acceptance, and registration are summarized in Table 1. Papers were submitted from 27 countries/regions not only in Asia-Pacific, but also all over the world. Table 2 shows the top ten countries/regions for the number of the registered papers. A lot of reviewers including TPC members, who were nominated by international review system, contributed energetically multiple-review work in a limited time and supported TPC.

On the first day, October 23<sup>rd</sup>, five technical short courses were presented. After that, participants were hosted at the welcome reception.

On the second day, October 24<sup>th</sup>, the opening ceremony was held (Fig. 1), and two plenary talks were presented. Also, on the third day, a plenary talk was presented. These plenary talks focused on future challenges of antennas, propagation, and related systems such as 5G communication, and are listed below.

- Dr. Hongbeom Jeonv (Infra Lab. KT, Korea), “5G Commercialization and Future Change”
- Prof. William Scanlon (Tyndall National Institute, Ireland), “Next Steps in Antennas and Propagation for Implantable Biosensors and Systems”
- Dr. Yukihiko Okumura (Research Laboratories, NTT DOCOMO, INC., Japan), “Toward Actualization of 5G by Co-Creation with a Wide Range of Vertical Industries”

Table 1 Statistics of papers.

Submitted Papers	549
Accepted Papers	498
Registered Papers	484 (88.2%)

Table 2 Top ten for registered papers.

Korea	161
Japan	119
China	77
Taiwan	25
Thailand	19
Malaysia	16
India	11
U.S.A.	10
Indonesia	6
Sweden	6



(a) Greeting from General Chair, Prof. J. Choi.



(b) Prof. J. Choi and Prof. M. Ando (IEICE Chair)

Fig. 1 Opening Ceremony.



After the opening ceremony, 56 technical oral sessions, 3 poster sessions were presented during three days from October 24<sup>th</sup> to 26<sup>th</sup>.

Participants were hosted at the comfortable Banquet in the evening on October 25<sup>th</sup>, and enjoyed Korean performances (Fig. 2).

## 2. ISAP International Steering Committee Meeting

The ISAP International Steering Committee (ISC) Meeting was held at the symposium venue in the evening on October 24<sup>th</sup>.

The ISAP-ISC was established at ISAP2006 by members from 9 countries/regions. The mission of the committee is planning future ISAP and establishing operation rules to steer the symposia smoothly using international cooperation. Now, the committee members are from 12 countries/regions; Australia, China, Hong Kong, India, Japan, Korea, Macau, Malaysia, Singapore, Taiwan, Thailand, and Indonesia.

The operation and venue for future ISAP were discussed in this meeting. After the discussion, it has been decided that the venue of ISAP2021 will be Taipei, Taiwan. Incidentally, the venues up to 2020 have been decided to be Xi'an, China in 2019, and Osaka, Japan in 2020.

The next chair and secretary of ISC were elected in this meeting. Prof. Yingjie Jay Guo, University of Technology Sydney, was elected as next chair, and Prof. Kunio Sakakibara, Nagoya Institute of Technology, was elected as next secretary.

Figure 3 shows photo of the ISC Member.

## 3. ISAP Archives

ISAP-ISC also set up ISAP Archives recording the papers presented at the past ISAP. At this time, all the papers from the first ISAP in 1971 to ISAP2016 have been digitized and online. As a result, anybody in the world AP community can access ISAP papers with free of charge. The archive is updated every year. This service will respond to expectations of AP specialists in the world and enhance motivations especially for Asian people to submit papers.

The URL of the ISAP Archives is “[http://www.ieice.org/cs/isap/ISAP\\_Archives/](http://www.ieice.org/cs/isap/ISAP_Archives/)” and the top page is shown in Fig. 4. The papers of the latest ISAP will be archived almost a half year later after the ISAP. The papers of ISAP2018 will appear in the ISAP Archives soon. In addition to the ISAP Archives, the papers of recent ISAPs have also been included in IEEE Xplore.

## 4. Conclusion

ISAP2018 provided to contributors and participants an academic and friendship atmosphere for exchanging advances in AP research and strengthening relationship. Many young students also had a chance to discuss with the experts in their fields. The upcoming ISAP2019 will be held in Xi'an, China, from October 27<sup>th</sup> to 30<sup>th</sup>, 2019. Deadline for paper submission is June 10<sup>th</sup>, 2019. For more details, please visit the ISAP2019 Web site shown in Fig.5 (<http://www.em-conf.com/isap2019/>).



Fig. 2 One Scene in the Banquet.



Fig. 3 ISC Member.

Year	Dates	Location
2019	30th Oct. - 2nd Nov.	Phuket, Thailand
2018	9-12th November	Hubert, Australia
2017	2-5th December	Kaohsiung, Taiwan
2016	24-28th October	Okinawa, Japan
2015	23-25th October	Nagoya, Japan
2014	25-28th October	Jeju, Korea
2013	21-25th October	Nanjing, China
2012	29th Oct. - 2nd Nov.	Nagoya, Japan
2011	27-30th October	Taipei, Taiwan
2010	23-26th November	Macao, China
2009	20-23th October	Bangkok, Thailand
2008	27-30th October	Taipei, Taiwan
2007	20-24th August	Niigata, Japan
2006	1-4th November	Singapore, Singapore
2005	3-5th November	Seoul, Korea

Fig. 4 ISAP Archives Web site.  
([http://www.ieice.org/cs/isap/ISAP\\_Archives/](http://www.ieice.org/cs/isap/ISAP_Archives/)).



Fig. 5 ISAP2019 Web site.  
(<http://www.em-conf.com/isap2019/>).

# Summary Report on the 7<sup>th</sup> IEEE International Conference on Cloud Networking (IEEE CloudNet 2018)

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<sup>3</sup>NTT Corp., <sup>4</sup>Tokushima University,

<sup>5</sup>Sophia University, <sup>6</sup>Hitachi, Ltd.,

<sup>7</sup>Kyushu Institute of Technology, <sup>8</sup>University of Fukui



## 1. Introduction

The 7<sup>th</sup> IEEE International Conference on Cloud Networking (IEEE CloudNet 2018) was held in Daiwa Ubiquitous Computing Research Building in the Hongo campus of the University of Tokyo from October 22<sup>nd</sup> to October 24<sup>th</sup>, 2018 (see Fig. 1). This conference was technically co-sponsored by IEICE Communication Society, and it was organized by great cooperation of the IEICE Technical Committee on Network Systems (NS) [1].

## 2. Objective

Network technologies are making rapid progress to support new types of communications, such as URLLC (Ultra Reliable and Low Latency Communication), mMTC (massive Machine Type Communication), and eMBB (enhanced Mobile BroadBand), as observed in the recent development of 5G mobile communication and IoT trends. Emerging applications such as autonomous/cooperative driving, drone surveillance, remote sensing and data analysis are causing the conventional cloud computing model to evolve towards edge computing to utilize these advanced communications.

Cloud networking has emerged as a promising direction for cost-efficient and reliable service delivery across data communication networks. The dynamic location of service facilities and the virtualization of hardware and software elements are stressing the communication network and protocols, especially when datacenters are interconnected through the Internet. Emerging Network Function Virtualization (NFV) and Software Defined Network (SDN) can play significant roles by improving the dynamicity and programmability of cloud networks. Middlebox has been significantly improved the agility of cloud network deployment and management.



Fig. 1 Opening remarks by Prof. Akihiro Nakao (The University of Tokyo), General co-chairs.

CloudNet 2018 serves a role of getting together world's most distinguished researchers in this field to discuss the research topic in Tokyo, where a variety of applications using cloud and advanced networking are being developed for 2020 Olympic and Paralympic Games.

## 3. Scope and History

The conference topics include:

- Cloud network and resource management
- Cloud network and virtualization
- Cloud network and supported services
- Cloud network architecture
- Cloud network security and privacy

The topics are not limited to the above, but a wide topics related to cloud networking are included.

The history of CloudNet is as follows.

- The 1<sup>st</sup> CloudNet: Paris, November 2012
- The 2<sup>nd</sup> CloudNet: San Francisco, November 2013
- The 3<sup>rd</sup> CloudNet: Luxembourg, October 2014
- The 4<sup>th</sup> CloudNet: Niagara Falls, October 2015
- The 5<sup>th</sup> CloudNet: Pisa, October 2016
- The 6<sup>th</sup> CloudNet: Prague, September 2017



In 2018, IEEE CloudNet was held for the first time in the Asia-Pacific region.

**4. Overview of Conference Program**

In IEEE CloudNet 2018, 26 papers were accepted for technical sessions and 45 papers were accepted for poster sessions. Fig. 2 shows how many papers were accepted for technical sessions from each country.

During three conference days, there were five technical sessions and five poster sessions (see Fig. 3). Moreover, there are three keynote speeches, two invited special sessions, and one Distinguished Expert Panel (DEP) session. This conference had over 140 participants.

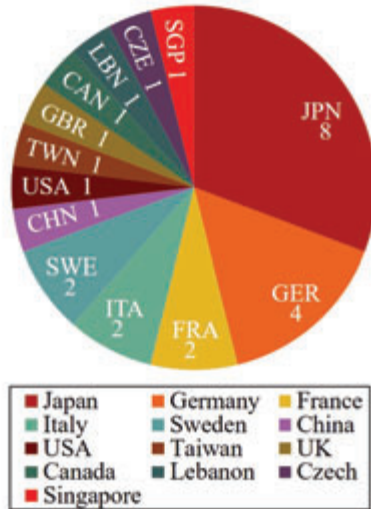


Fig. 2 Statics of accepted papers for technical sessions.

**5. Keynote**

In each conference day, the following keynote speeches were presented:

- Cloud-Native Networks for The Advancement of AI/IOT, Dr. Masahisa Kawashima (Vice President, NTT Software Innovation Center)
- CORD: A Multi-Access Edge Cloud, Prof. Larry Peterson (CTO, Open Networking Foundation)
- Platforms for Advanced Wireless Research - Understanding the Interplay Between Radio, Cloud and Networking in Future Mobile Networks, Prof. Abhimanyu Gosain (Technical Program Director, Northeastern University)

After each keynote speech, many attendees actively took part in the discussion. Fig. 4 shows the keynote speech on the first conference day.

**6. Invited Special Sessions**

On October 23<sup>rd</sup>, the first invited special session entitled “Initiatives of Nation-wide Open Testbed and Academic Backbone Network using SDN/NFV in Japan” was held with the following presentations:

- R&D Testbed for IoT Networking and Computing, Dr. Hiroaki Harai (Director General, National Institute of Information and Communications Technology)

	Oct. 22 (Mon)	Oct. 23 (Tue)	Oct. 24 (Wed)
8:00 – 8:45			
8:45 – 9:00	Opening		
9:00 – 10:00	Keynote Masahisa Kawashima	Keynote Larry Peterson	Keynote Abhimanyu Gosain
10:00 – 10:40	Poster Session (Coffee Break)	Poster Session (Coffee Break)	Poster Session (Coffee Break)
10:40 – 12:20	Technical Session NFV	Technical Session Traffic Measurements	Special Session Progress and Prospects of Cloud Networking Platform
12:20 – 13:30	Lunch	Lunch	Lunch
13:30 – 15:10	Technical Session Mobile Cloud Computing	Special Session Initiatives of Nation-wide Open Testbed and Academic Backbone Network in Japan	Distinguished Expert Panel CloudNet towards the edge: where is the frontier?
15:10 – 15:50	Poster Session (Coffee Break)	Poster Session (Coffee Break)	
15:50 – 17:10	Technical Session SDN	Technical Session Applications	Closing
17:10 – 17:30			
18:00 –	Welcome Reception (18:00 – 20:00)	Banquet Yakatabune (18:10 – 21:00)	

Fig. 3 Program at a glance.



Fig. 4 Keynote speech by Dr. Masahisa Kawashima (Vice President, NTT Software Innovation Center).

- SINET5: A Low-latency and High-bandwidth Academic Backbone Network for SDN/NFV and IoT/5G Cloud Networking Era, Koji Sasayama (Professor, National Institute of Informatics)

Moreover, on October 24<sup>th</sup>, the second invited special session entitled “Progress and Prospects of Cloud Networking Platform” was held with the following presentations:

- Cloud Native Connectivity Platform for Accelerating IoT Innovations, Dr. Kenta Yasukawa (CTO, SORACOM)
- SDN & Programmable Switches, Prof. Nick McKeown (Professor, Stanford University)

Fig. 5 shows a presentation in the second special invited session.





Fig. 5 Invited speech by Prof. Nick McKeown (Professor, Stanford University).

## 7. DEP Session

As the final session of IEEE CloudNet 2018, Distinguished Expert Panel (DEP) was held by a moderator and five panelists (see Fig. 6).

- Moderator:
  - Alex Galis (Professor, University College London)
- Panelists:
  - Dr. Bryan Stiekes (Technical Director, Google)
  - Prof. Larry Peterson (CTO, Open Networking Foundation)
  - Prof. Kohei Shiomoto (Professor, Tokyo City University)
  - Dr. Kenta Yasukawa (CTO, SORACOM)
  - Dr. Changhoon Kim (CTO of Applications, Barefoot Networks)



Fig. 6 Discussions in DEP session.

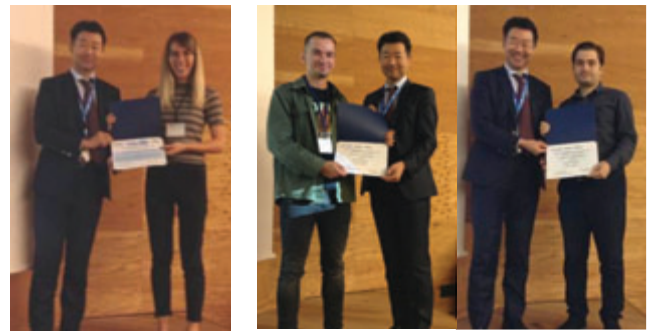
## 8. Awards

In the closing session, the award ceremony was held and a best paper, a best student paper, and two student travel grants were awarded (see Fig. 7):

- Best paper award
  - Adaptive In-network Guidance Dissemination from Hot-Spot Nodes of Queries in Breadcrumbs-Based Information-Centric Networks, Hideki Tode, Ken-ichi Hashimoto, and Yosuke Tanigawa (Osaka Prefecture University)
- Best student paper award
  - On the Cost of Measuring Traffic in a Virtualized Environment, Karyna Gogunskaya, Chadi Barakat (INRIA), Guillaume Urvoy-

Keller (Université de Nice Sophia-Antipolis), Dino Lopez Pacheco (University Nice Sophia Antipolis)

- Student travel grant
  - Hi-Clust: Unsupervised Analysis of Cloud Latency Measurements through Hierarchical Clustering, Pavol Mulinka (Czech Technical University in Prague)
  - NFV-Inspector: A Systematic Approach to Profile and Analyze Virtual Network Functions, Michel Gokan Khan (Karlstad University)



(a) Best student paper award

(b) Student travel grant

Fig. 7 Award ceremony.

## 9. Social Events

The welcome reception was held at Capo Pellicano in the Hongo campus of the University of Tokyo on October 22<sup>nd</sup>.

The banquet was held on October 23<sup>rd</sup> on Yakatabune (Traditional Japanese Dinner Cruise) as shown in Fig. 8. The boat departed from Asashio canal pier, and then the banquet ended at Asakusa Azumabashi pier. All attendees enjoyed dinner cruise with beautiful night scene.

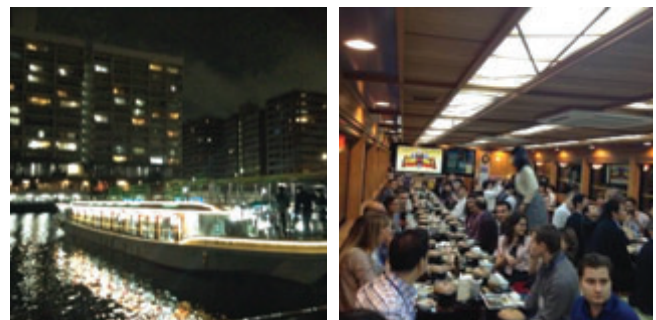


Fig. 8 Banquet on Yakatabune.

## 10. Conclusion and Next Conference

We believe that IEEE CloudNet 2018 ended in a big success with many attendees. In 2019, IEEE CloudNet will be held in Portugal. We look forward to meeting many researchers in next IEEE CloudNet.

## 11. Reference

- [1] IEEE CloudNet 2018 conference page, <http://cloudnet2018.ieee-cloudnet.org/>

# Participation Report for the 7<sup>th</sup> IEEE International Conference on Cloud Networking (IEEE CloudNet 2018)

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<sup>4</sup>Nara Institute of Science and Technology



## 1. Introduction

The 7<sup>th</sup> IEEE International Conference on Cloud Networking (IEEE CloudNet 2018) was held at Daiwa Ubiquitous Computing Research Building, the University of Tokyo from October 22<sup>nd</sup> to 24<sup>th</sup>, 2018. The purpose of the conference is to serve a role of getting together world's most distinguished researchers in the fields of "cloud" computing and advanced "net" working to discuss the research topics [1].

## 2. First Conference Day (October 22<sup>nd</sup>)

On the first day, we had one keynote speech, three technical sessions, and two poster sessions. The keynote speech titled "Cloud-Native Networks for The Advancement of AI/IOT" was provided by Dr. Masahira Kawashima who is a Vice President, NTT Software Innovation Center. The keynote speech highlights some of technical challenges to enterprise's IT infrastructure management caused by the growth of Internet of Things (IoT) and proposes the hyperconvergence of compute, storage, and network. It also suggests several R&D items for the realization of the new architecture.

The technical sessions focused on three topics: Network Functions Virtualization (NFV), Mobile Cloud Computing, and Software-Defined Networking (SDN). Each technical session has five technical papers. In the sessions about NFV, the presenters talked about several topics regarding NFV including IT system update, resource isolation, routing, cloud monitoring, and resource allocation (see Fig. 1). The session of Mobile Cloud Computing provided new technologies such as mobile edge computing, anomaly detection, computation offloading and risk management. In the session of SDN, the presenters introduced new applications and systems for SDN.

The poster sessions had 16 poster presentations (see Fig. 2). The topics of those presentations included sensor networks, mobile edge computing, IoT in addition to SDN, NFV, and Mobile Cloud Computing. Many participants attended the poster sessions and discussed these topics eagerly.



Fig. 1 Technical session on the first conference day.

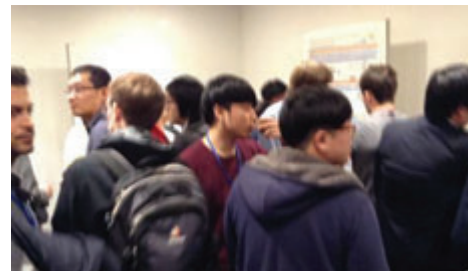


Fig. 2 Poster session on the first conference day.

## 3. Second Conference Day (October 23<sup>rd</sup>)

The second day of the conference consists of one keynote speech, two technical sessions, one invited special session, and two poster sessions. The keynote presentation was delivered by Prof. Larry Peterson (CTO, Open Network Foundation). His presentation was titled "CORD: A Multi-Access Edge Cloud" (see Fig. 3). He provided the overview and challenges of CORD that is an architecture to support one or more access technologies and telecommunication functions. This keynote speech was a presentation on technologies that support future edges and clouds from the viewpoint of ONF. In particular, CORD's role for several Cloud and Edge services within ONF was introduced, and the concepts and approaches of ONF to coordinate different services (functions) from both software and hardware aspects were provided. These would have significantly helped us think about the challenges and guidelines that we need to address the fields of IoT and Edge technologies. More than 70 participants listened to the keynote and had lively discussions.



In the special section, Dr. Harai from National Institute of Information and Communication Technology (NICT) introduced testbeds of “High-speed & IoT” and “Network & Distributed Cloud” presented by NICT. Next, Dr. Sasayama from National Institute of Informatics (NII) introduced the SINET5 (Science Information Network 5) that is Japanese academic backbone network, and he presented the review of multi-layer network architecture and some new characteristics, such as SDN-oriented layer-2 on-demand VPN services. These testbeds and networks are indispensable for R&D to support the era of IoT and Edge Networking, and we hope to promote research using these testbeds.

Besides that, there were eight technical presentations including the Best Paper award and 14 poster presentations. More than 50 audiences participated in all sessions, and they enjoyed the discussion.



Fig. 3 Keynote speech by Prof. Larry Peterson (CTO, Open Network Foundation).

#### 4. Final Conference Day (October 24<sup>th</sup>)

The program of the final day consists of the third keynote speech, a poster session, the second invited special session, and a distinguished expert panel session.

The third keynote speech with title “Platforms for Advanced Wireless Research – Understanding the interplay between radio, cloud and networking in future mobile networks” was delivered by Prof. Abhimanyu Gosain, who is a technical program director at Northeastern University. In the keynote speech, the keynote speaker introduced a \$100 million public-private partnership; Platforms for Advanced Wireless Research (PAWR) and two PAWR awardees.

The second invited special session consists of two invited talks. The first invited talk with title “SORACOM: Cloud Native Connectivity Platform for accelerating IoT innovations” was given by Dr. Kenta Yasukawa, who is CTO and Cofounder of SORACOM, Inc. In the invited talk, the invited speaker explained how a cloud native connectivity provider solves common challenges in IoT. The second invited talk with title “SDN & Programmable Switches” was given by Prof. Nick McKeown from Stanford University. In the invited talk, the invited speaker discussed the principle of SDN and the state-of-the-art programmable switch.

The distinguished expert panel session with title “CloudNet towards the edge: where is the frontier?” was moderated by Prof. Alex Galis from University

College London. The panel session had five panelists: Dr. Bryan Stiekes, Prof. Larry Peterson, Prof. Kohei Shiimoto, Dr. Kenta Yasukawa, and Dr. Changhoon Kim. The topics included research challenges in edge computing, how to accelerate networking research community, and new killer applications in edge computing.

#### 5. Banquet and Social Event

CloudNet holds three kinds of social events, which are a coffee break conjunction with a poster session, the welcome reception, and the banquet. Regarding to coffee break, we had one or two slot every day; totally 5 slots during the 3-day conference. Since posters were presented in conjunction with a coffee break, we could really enjoy a cup of good coffee or tea as well as good posters. There seem to be many accepted posters; every poster slot has different set of posters and thus we had no chance to miss any of them.

The welcome reception, on the first day, is held at the top floor at one of buildings in the University of Tokyo. Since the number of attendees to the reception seems to be more than a hundred, the venue was crowded but we could have much opportunities to meet a lot of people and talk. Also, although the reception venue is with a good night view --- we can even see a famous tower of Tokyo, Tokyo Skytree, outside the window ---, almost people had been focusing on talk. Many attendees seemed to not finish talking after it is over.

Finally, on the second day, we had a banquet on a cruise. The cruise ship went around Tokyo Bay and Sumida River. We could enjoy a beautiful night view of Tokyo. Since the cruise provided Japanese traditional foods and drinks, non-Japanese people seemed to pause on having them (see Fig. 4). It rather made our conversation more and more impressive. We all got to know each other thanks to such cultural experiences.



Fig. 4 Banquet.

#### 6. Conclusion

IEEE CloudNet in Japan was greatly successful. We enjoyed all sessions and social events. We would like to attend the next IEEE CloudNet again.

#### 7. Reference

- [1] IEEE CloudNet 2018 conference page, <http://cloudnet2018.ieee-cloudnet.org/>



# Report on the 7<sup>th</sup> IEEE International Conference on Renewable Energy Research and Applications (ICRERA2018)

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Panasonic Corporation



## 1. Introduction

The 7<sup>th</sup> IEEE International Conference on Renewable Energy Research and Applications (ICRERA2018) was held on 14-17 October 2018 in Paris, France. ICRERA has been held annually from the 1<sup>st</sup> ICRERA2012. ICRERA has expanded its significance and has grown up to be one of the most important technical events leading the field of renewable energy technologies.

ICRERA2018 is organized and mainly sponsored by the International Journal of Renewable Energy (IJRER) and the International Journal of Smart Grid (ijSmartGrid). It is also supported by technical co-sponsors including The IEEE Industry Applications Society (IAS), IEEE Industrial Electronics Society (IES), the Institute of Electrical Engineers of Japan (IEEJ) and of course the Institute of Electronics, Information and Communication Engineers (IEICE). It is also supported by Université du Havre and Université Paris-Est Créteil, France, Nagasaki University and Nagasaki Institute of Applied Science, Japan, Gazi University and Nisantasi University, Turkey.

## 2. Conference Overview and Tutorials

The conference program consisted of 4 tutorials, 4 keynotes, an industrial talk, 42 technical sessions. The first day of the conference was opened by the full slate of 4 tutorials by respected lecturers about integration of large renewable energy sources (two parts), topologies and control of power converters in smart grid system, and big data analytics for smart grid systems, respectively. 300 people have registered for active participation and prolific exchange of ideas.



Fig. 1 FIAP Jean-Monnet Centre's entrance.

## 3. Opening Ceremony and Keynote Speeches

In the morning of the second conference day, the opening ceremony was held by the general chair, Prof. B. Dakyo with the general co-chairs, Prof. I. Colak and Prof. F. Kurokawa. After the opening ceremony, Prof. J. W. Kolar and Prof. P. Siano gave keynote presentations on the essence of solid-state transformers and a transactive energy approach for energy management in smart building, respectively. Also in the next morning, Prof. C. Buccella and Prof. S. Bacha presented keynotes on the low switching frequency modulation techniques for renewable energy multilevel converters and the large-scale integration of renewable electricity generation and HVDC grids, respectively. Mr. A. Kawakami, the vice president of TMEIC Co. gave an industrial talk on the more renewables, more stable power and more energy efficiency in power grid.

## 4. Technical Program

ICRERA2018 technical program drew total 522 digest papers submitted from 62 countries. 262 papers from 52 countries were accepted through peer review process and resulted in papers presented in 193 oral styles and 62 poster styles in 4-5 parallel 42 sessions including 38 oral and 4 poster sessions.

## 5. Conclusions

ICRERA2018 has been successfully ended after 4 days of productive activities with participation of attending 300 professionals and researchers, providing an excellent venue and facilitating the research collaboration in renewable energy technologies.

The next 8<sup>th</sup> IEEE ICRERA2019 is going to be held this year and details are to be announced very soon.



Fig. 2 Keynote presentation by Prof. J. W. Kolar.

# Report on Internet Conference 2018 (IC2018)

Ryohei Banno  
Assistant secretary, Technical Committee on  
Internet Architecture, IEICE



## 1. Introduction

Internet Conference 2018 (IC2018) was held in Tokyo, Japan, on November 26<sup>th</sup>-27<sup>th</sup>, 2018 [1]. It was sponsored by JSPS 163<sup>rd</sup> Committee on Internet Technology (ITRC), in cooperation with relevant organizations including IEICE Technical Committee on Internet Architecture (TCIA) and Technical Committee on Network Systems (TCNS).

IC has played a significant role to provide the venue to learn and discuss the Internet and its technologies, from its 1<sup>st</sup> event in 1996. This year, the conference intended to offer opportunities to exchange knowledges and opinions regarding the Internet-related emerging technologies and the vision of the future Internet.

## 2. Conference Program

The conference consisted of 7 invited talks, 3 special presentations, 2 paper presentations, and 17 poster presentations.

The first day of the conference began with an invited talk entitled “Internet Civilization”, given by Prof. Jun Murai from Keio University.



Fig. 1 Invited talk by Prof. Jun Murai.

There were about 80 participants, and active discussions on every Q&A session.

The poster session had also intensive discussions between poster speakers and attendees. Topics were wide-ranging and related to such as the following technologies:

- Software-defined networking
- Blockchain
- Internet of things
- E-learning
- Vehicle-to-vehicle communication



Fig. 2 Q&A session.

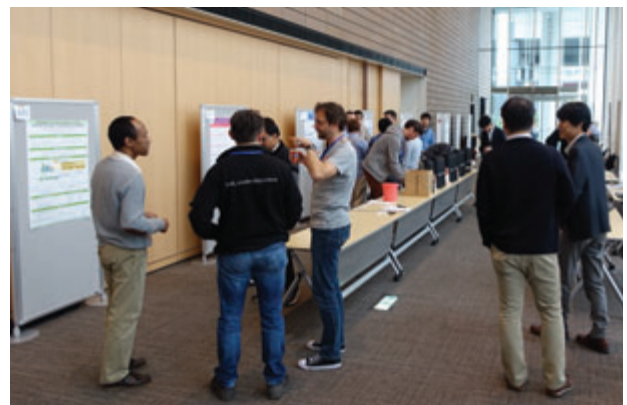


Fig. 3 Poster session.

- Cyber security
- Edge computing
- Logging
- Traffic engineering
- Operating system level virtualization
- Network function virtualization
- IPv6

## 3. Conclusion

IC2018 was successfully organized with lots of impressive talks and discussions, owing to the great effort by participants and staffs. TCIA and TCNS would like to express our profound gratitude to all the relevant people.

## 4. Reference

- [1] <https://www.internetconference.org/>

## IEICE-CS Related Conferences Calendar

Date	Conference Name	Location	Note
26 Oct. – 30 Oct. 2020	2020 International Symposium on Antennas and Propagation ( <b>ISAP2020</b> )	Osaka, Japan	TBD
29 Oct. – 1 Nov. 2019	The 37 <sup>th</sup> International Communications Satellite Systems Conference ( <b>37<sup>th</sup> ICSSC</b> ),	Okinawa, Japan	Submission due: 15 May 2019
27 Oct. – 30 Oct. 2019	2019 International Symposium on Antennas and Propagation ( <b>ISAP2019</b> )	Xi'an, China	Submission due: 10 June 2019
28 July – 2 Aug. 2019	IEEE International Geoscience and Remote Sensing Symposium 2019 ( <b>IGARSS 2019</b> )	Yokohama, Japan	Submission deadline: Closed
7 July – 11 July 2019	The 24 <sup>th</sup> Opto-Electronics and Communications Conference / International Conference on Photonics in Switching and Computing 2019 ( <b>OECC / PSC2019</b> )	Fukuoka, Japan	Submission deadline: Closed
2 July – 5 July 2019	International Conference on Ubiquitous and Future Networks 2019 ( <b>ICFUN2019</b> )	Zagreb, Croatia	Submission deadline: Closed
3 June – 7 June 2019	2019 Joint International Symposium on Electromagnetic Compatibility and Asia-Pacific International Symposium on Electromagnetic Compatibility, Sapporo ( <b>EMC Sapporo &amp; APEMC 2019</b> )	Sapporo, Japan	Submission deadline: Closed
29 May – 31 May 2019	International symposium on extremely advanced transmission technology ( <b>EXAT 2019</b> )	Ise, Japan	Submission due: 15 March 2019
20 May – 23 May 2019	International Conference on DC Microgrids ( <b>ICDCM2019</b> )	Matsue, Japan	To be held <b>soon</b>
28 April 2019	Technology Trials and Proof-of-Concept Activities for 5G and Beyond Industry and Academic Panel 2019 ( <b>TPoC5G Panel 2019</b> )	Kuala Lumpur, Malaysia	To be held <b>soon</b>
8 April – 15 April 2019	The 5 <sup>th</sup> International Workshop on Smart Spectrum ( <b>IWSS2019</b> )	Marrakech, Morocco	To be held <b>soon</b>
15 April 2019	The 12 <sup>th</sup> International Workshop on Evolutional Technologies & Ecosystems for Beyond 5G ( <b>WDN-5G WCNC2019</b> )	Marrakech, Morocco	To be held <b>soon</b>
8 April – 10 April 2019	The 14 <sup>th</sup> International Symposium on Autonomous Decentralized Systems ( <b>ISADS2019</b> )	Utrecht, Netherlands	To be held <b>soon</b>
11 Feb. – 13 Feb. 2019	2019 International Conference on Artificial Intelligence in Information and Communication ( <b>ICAIIIC 2019</b> )	Okinawa, Japan	Done
16 Dec. – 18 Dec. 2018	International Japan-Africa Conference on Electronics, Communications and Computations 2018 ( <b>JAC-ECC 2018</b> )	Alexandria, Egypt	Done
4 Dec. – 6 Dec. 2018	International Conference on Smart Grids ( <b>icSmartGrids2018</b> )	Nagasaki, Japan	Done



<b>Date</b>	<b>Conference Name</b>	<b>Location</b>	<b>Note</b>
26 Nov. – 27 Nov. 2018	Internet Conference 2018 ( <b>IC2018</b> )	Tokyo, Japan	<b>Reported</b> on this issue
12 Nov. – 14 Nov. 2018	The 24 <sup>th</sup> Asia-Pacific Conference on Communications ( <b>APCC2018</b> )	Ningbo, China	Done
6 Nov. – 9 Nov. 2018	2018 Asia-Pacific Microwave Conference ( <b>APMC 2018</b> )	Kyoto, Japan	Done
23 Oct. – 26 Oct. 2018	2018 International Symposium on Antennas and Propagation ( <b>ISAP2018</b> )	Busan, Korea	<b>Reported</b> on this issue
22 Oct. – 24 Oct. 2018	2018 IEEE 7 <sup>th</sup> International Conference on Cloud Networking ( <b>CloudNet2018</b> )	Tokyo, Japan	<b>Reported</b> on this issue
17 Oct. – 19 Oct. 2018	International Conference on Information and Communication Technology Convergence 2018 ( <b>ICTC2018</b> )	Jeju Island, Korea	<b>Reported</b> on this issue
14 Oct. – 17 Oct. 2018	International Conference on Renewable Energy Research and Applications ( <b>ICRERA2018</b> )	Paris, France	<b>Reported</b> on this issue
19 Sep. – 21 Sep. 2018	Photonics in Switching and Computing 2018 ( <b>PSC 2018</b> )	Limassol, Cyprus	<b>Reported</b> on this issue

Please confirm with the following IEICE-CS web site for the latest information.  
<http://www.ieice.org/cs/conf/calendar.html>

## Call For Participation

### ----- Technology Trials and Proof-of-Concept Activities for 5G and Beyond Industry and Academic Panel 2019 (TPoC5G Panel 2019) -----

TPoC5G Panel 2019 workshop will be held in Kuala Lumpur, Malaysia in conjunction with the 2019 IEEE 89th Vehicular Technology Conference: VTC2019-Spring. This workshop is technically co-sponsored by IEICE (Institute of Electronics, Information and Communication Engineers) technical committees on Radio Communication Systems (RCS) in Japan.

#### **Scope and topics**

The 5th generation (5G) cellular communication systems are going to be launched in 2019. In the 5G standard, key enabling technologies such as massive MIMO, beamforming, or a new radio access technology are specified, and the research and development of those key technologies have been carried out in many research entities. On top of that, new technology concepts for beyond 5G (B5G) have been currently investigated. In these regards, this panel session is aiming to provide opportunities to present the latest trials for 5G and the proof-of-concept activities for B5G. Distinguished speakers from industry as well as from academia will present their latest research and development results and will prove their perspective regarding the new directions of B5G. Through the discussion at the workshop, it is also expected to promote the exchange of new ideas among researchers.

#### **Keynote Presentation:**

- ✓ **Prof. Fumiyuki Adachi (Tohoku University, Japan)**

#### **Panel Session:**

- ✓ **Dr. Yukihiro Okumura (NTT DOCOMO, Japan)**
- ✓ **Dr. Hiroyuki Seki (Fujitsu Laboratories, Japan)**
- ✓ **Dr. Sun Sumei (Institute for Infocomm Research, Singapore)**
- ✓ **TBD (from Europe)**

#### **General Co-Chairs:**

Tomoaki Ohtsuki (Keio University), Gerhard Bauch (Hamburg University of Technology)

**Committee:** Yukitoshi Sanada (Keio University), Satoshi Suyama (NTT DOCOMO), Toshihiko Nishimura (Hokkaido University), Yuyuan Chang (Tokyo Institute of Technology), Shinsuke Ibi, (Osaka University)

#### **Contact Information:**

racs\_ac-vtc2018s@mail.ieice.org

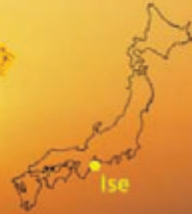
**For more information, please access the following link:**

<http://www.ieice.org/cs/racs/tpoc5g/>

# International Symposium

# EXAT 2019

伊勢志摩



Ise Shrine



Uji Bridge



Oharai-machi



Akafuki



Okage-yokocho



Isetopia

©(公社)三重県観光連盟 (玉姫岩の写真)

## CALL FOR PAPERS

**SUBMISSION DEADLINE: MARCH 15, 2019  
(POSTER ONLY)**

**Place: Lifelong Learning Center ISETOPIA, Ise, Japan**

**Date: May 29 (Wed) – May 31 (Fri) 2019**

This is the 5<sup>th</sup> EXAT international symposium after EXAT 2008/2013/2015/2017 held in Tokyo, Sapporo, Kyoto and Nara. Its objective is to discuss the current status and challenges for practical implementation of 3M (multi-core, multi-mode, multi-level transmission) technologies.

**For more details please visit <http://exat-sympo.org>**

Co-sponsor



Technical co-sponsor







Xi'an, China  
October 27-30

<http://www.em-conf.com/isap2019>



## Call for Papers

2019 International Symposium on Antennas and Propagation (ISAP2019) is intended to provide an international forum for the exchange of information on the progress of research and development in antennas, propagation, electromagnetic wave theory, and related fields as shown in the Topics. It is also an important objective of this meeting to promote mutual-interaction among participants.

ISAP2019 will be held in Xi'an, China from October 27 to 30, 2019. During Xian's 3,100 year development, 13 dynasties placed their capitals here. Xian enjoys equal fame with Athens, Cairo, and Rome as one of the four major ancient civilization capitals. ISAP2019 is co-sponsored and co-organized by Xidian University, Southeast University, South China University of Technology, and is technically co-sponsored by CIE Antenna Society, CIE Microwave Society, IEICE Communications Society, IEEE Antennas and Propagation Society, European Association on Antennas and Propagation (EurAAP), IEEE AP/MTT Xi'an Chapter and IEEE AP-MTT-EMC Joint Nanjing Chapter.

### Topics

- 1 Antenna Analysis & Synthesis
- 2 Antenna Measurements Techniques A-3
- Antenna Manufacturing Technologies A-4
- Small & Miniaturized Antennas
- 5 Reflector & Lens Antennas
- 6 Phased Array & Air-fed Array
- 7 Broadband & Multi-frequency Antennas A-
- 8 Millimeter- & THz-Wave Antennas
- A-9 Multi-function & Reconfigurable Antennas
- B-1 Mobile & Indoor Propagation
- B-2 Space-Time Channel Characterization
- B-3 Terrestrial & Earth-Space Propagation
- B-4 Ionospheric Propagation
- B-5 DOA Estimation
- 6 SAR Polarimetry & Interferometry
- 7 Wireless Power Transmission
- C-1 Electromagnetic Theory & Modeling
- C-2 Computational Electromagnetics
- C-3 Analysis for Multi-scale Problems
- C-4 Scattering & Diffraction
- C-5 Inverse Problems
- C-6 Remote Sensing
- C-7 Random Media & Rough Surfaces
- C-8 EBG and Metamaterials
- 1A & P for Mobile & Vehicular Communication
- 2A & P for Body-Centric Wireless Communication D-
- 3 A & P for MIMO & Cooperative Communication D-
- 4 A & P for Cognitive Wireless Networks
- D-5 A & P for Radio Positioning & Broadcasting
- D-6 A & P for Medical Applications
- D-7 A & P for RFID Applications
- D-8 EMC/EMI Technologies

### Submission Information

All submissions must be electronic in IEEE Xplore-compliant PDF format only and hard copies will not be accepted. All papers must be written in English and limited to three pages including text, references, and figures. Presented papers will be included in IEEE Xplore and ISAP Archives.

### Student Paper Contest

Student paper contest is limited to full time student who must be the first author of the paper, and the student is required to present their papers at the conference. The candidates are required to show their full time student identification cards on the registration desk. Each of the three final winners will be awarded the ISAP2019 Best Student Paper Prize with a certificate. All the students are encouraged to participate in the contest.

### Important Dates

Paper Submission Deadline	June 10, 2019
Acceptance Notification	July 15, 2019
Final Papers Submission	July 31, 2019
Advance Program Delivery	Sept. 01, 2019

### ORGANIZING COMMITTEE

General Co-chairs

Shuxi Gong (*XDU, China*)  
Wei Hong (*SEU, China*)  
Qingxin Chu (*SCUT, China*)

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Co-sponsored & Co-organized by



Technically co-sponsored by



# 37<sup>th</sup> ICSSC Conference - Call for Papers

October 29 – November 1, 2019 Okinawa, Japan

## Ensuring a Realistic Migration, Harmonization and Integration of Space Based Communications Facilities Within the 5G Network

The 37<sup>th</sup> **International Communications Satellite Systems Conference (ICSSC)**, one of the most influential technical conferences on satellite communications systems, will be held in Okinawa, Japan, on **October 29<sup>th</sup> through November 1<sup>st</sup>, 2019**. Monday, **October 29<sup>th</sup>** will be reserved exclusively to the **37<sup>th</sup> ICSSC Colloquium**.

The theme of the 2018 Joint Conference (36<sup>th</sup> ICSSC and 24<sup>th</sup> Ka Conference) was *Space based Communications, Applications and Technologies in the 5G Era*. The Colloquium and Plenary Panels introduced various activities for satellite communications usage in 5G networks, including introduction of optical technologies and massive impact of introducing 5G to space industries. The 37<sup>th</sup> ICSSC will address challenges, looking forward to the employment of new technologies, architectures and system solutions for migration, harmonization and integration to make 5G networks more attractive, effective and advanced.

The theme of the 37<sup>th</sup> ICSSC is **Realistic Migration, Harmonization and Integration with the 5G**. In addition, satellite communication industries in Asia-Pacific region and the activities will be expected to be introduced during the 37<sup>th</sup> ICSSC. With the continued transformation and the rapidly emerging introduction of 5G, the 37<sup>th</sup> International Communications Satellite Systems Conference is soliciting papers in all areas of activity covering the following topics:

### Topics:

- **New/Emerging Satellite Architectures and Concepts**
  - NGSO Constellations (Technology, System Complexity, Economic Viability), Stratospheric Platforms (Technology, Missions and Market Perspectives), Small Satellites (Technology, Missions, Flight Results and Market Perspectives), Telecommunications Systems and Technology for Space Exploration (Moon, Mars and beyond), Hosted Payloads, Digital Broadcast Platforms (Satellite and User

Segment Technologies and Market Perspectives)

- **New Satellite Component Technology**
  - High-Speed Optical Communications, Optical Payload Technologies, Optical Feeder Link technologies and systems, Network Protocols (Advanced Coding and Latency Provision), Cognitive Communication Networks, Antenna Technology, Reconfigurable Antennas, Active Direct Radiating Array, Q/V Band Technology, Experiments and Systems, High Speed Onboard Processing and Digital Payload Architecture and Technologies
- **Satellite Systems Research and Technology Development**
  - Security (Physical Layer Through Network Layer), Propagation Research Including Measurement and Modeling, Spectrum for New Services, Advanced NGSO and GSO inter-system, intra-system, interference mitigation techniques, Advanced Digital Payloads and Adaptive Transmit Power Allocation enabling Flexible HTS systems, Modular System Design, Systems Modeling, Market Assessment and Technology Forecasts, Integrated Applications and Services (Telecom, Earth Observation and Navigation), 5G Integration into Satellite Networks, Ultra-High Data Rate Modems Power and BW Efficient Modulation
- **New Satellite Markets**
  - UTM (UAS Traffic Management), Smart Cars/Smart Cities (Large Scale IoT), Autonomous Vessels, Air Traffic Management, In-flight Entertainment, Airline Operations, Package Delivery via Drones, Consumer satellite broadband in the era of 5G terrestrial rollout, Potential new or emerging applications to reinvigorate FSS-MSS growth, Launch Services, Commercialization of Space (Tourism and Exploration)

### Important Dates:

<b>Abstract due:</b>	<b>May 15<sup>th</sup>, 2019</b>
<b>Notification of acceptance:</b>	<b>July 19<sup>th</sup>, 2019</b>
<b>Final paper due:</b>	<b>Sep. 27<sup>th</sup>, 2019</b>

### Contact Information:

<http://www.kaconf.org/call4papersICSSC.php>

## Special Section Calendar of IEICE Transactions on Communications

Issue	Special Section	Note
Oct. 2020	New Era of Satellite Communication / Broadcasting / Application Technologies	Submission due: 1 October 2019 <b>See page 48</b>
Sep. 2020	Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019	Submission due: 1 October 2019 <b>See page 47</b>
Apr. 2020	Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure	Submission due: 13 May 2019 <b>See page 46</b>
Jan. 2020	Internet Architecture, Applications and Operation Technologies for a Cyber-Physical System	To be issued
Dec. 2019	No special section this issue	
Nov. 2019	No special section this issue	
Oct. 2019	Exploring Drone for Mobile Sensing, Coverage and Communications: Theory and Applications	To be issued
Sep. 2019	Enhancing Information Centric Networking Technologies Towards Real-world Infrastructure	To be issued
Aug. 2019	Technology Trials and Proof-of-Concept Activities for 5G and Beyond	To be issued
Jul. 2019	Communication Technologies and Service Qualities in Various Access Networks	To be issued
Jun. 2019	Healthcare, Medical Information and Communication Technology for Safe and Secure Society	To be issued <b>soon</b>
May 2019	European ICT R&D Project Activities on Broadband Access Technologies in Conjunction with Main Topics of 2016/2017 IEICE ICT	To be issued <b>soon</b>
Apr. 2019	Sensing, Wireless Networking, Data Collection, Analysis and Processing Technologies for Ambient Intelligence with Internet of Things	To be issued <b>soon</b>
Mar. 2019	Network Virtualization and Network Softwarization for Diverse 5G Services	Vol. E102-B, No. 3
Feb. 2019	Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2017	Vol. E102-B, No. 2
Jan. 2019	No special section this issue	

Please confirm with the following IEICE web site for the latest CALL FOR PAPERS  
<http://www.ieice.org/event/ronbun-e.php?society=cs>



## Call for Papers

# ----- Special Section on Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure" in the April 2020 issue.

To realize the "Industry, innovation and infrastructure" and "Sustainable cities and communities" adopted as the parts of the SDGs (Sustainable Development Goals), the achievement of "Society 5.0" concept, which brings us the broad range of innovations resulting from the data-driven cooperation between various services and industries, is essential. For this achievement, since the amount of traffic transmitted in several kinds of networks increases significantly and the traffic pattern also becomes more diversified than ever, it is indispensable to build up a new sustainable social information infrastructure network that can accommodate such huge and diversified traffic, while providing the flexibility, the robustness, and the intelligence for dealing with all kinds of situation. Therefore, emerging new network resource control and management technologies that can utilize in the wide range of environments such as wireless access networks, wireless core networks, substrate networks, and cloud networks, are expected. Theoretical performance analysis, simulation/emulation experiments, and experimental evaluations are also important to deploy the promising technologies for sustainable social information infrastructure.

Besides, in welcoming the 2020 Tokyo Olympic and Paralympic, a special section is being planned (scheduled to appear in the April 2020 issue) to further promote the above-mentioned researches and technologies for sustainable social information infrastructure. We thus call publications to discuss and develop the network resource control and management technologies including not only the emerging technical fields such as AI/Machine-Learning, IoT/IoE (IoX), 5G, Mobile Edge/Fog Computing, network virtualization/softwarelization/programmability, optical transport network, wireless access/core network, and infrastructure/cloud network, but also the promising application fields such as big data, cooperation in different fields, and utilization of data.

## 1. Scope of Network Resource Control and Management

This special section aims at timely dissemination of research in these areas. Possible topics include, but are not limited to:

- Artificial Intelligence (AI)
- Machine Learning (ML)
- Internet of Things/Everything (IoT/IoE: IoX)
- 5th Generation (5G)
- Fog Computing
- Multi/Mobile Edge Computing (MEC)
- Network Function Virtualization (NFV)
- Network Programmability
- Software-Defined-Network (SDN)
- Network Slicing
- Network Softwarization
- Microservice Architecture/API
- Energy-Efficient/Green Network
- Big Data
- Data Utilization
- Fixed Mobile Convergence (FMC)
- Cross Field Cooperation
- Wireless Access/Core Network
- Network Infrastructure
- Cloud Networking
- Optical Network Architecture
- Mobile Networks
- Security/Privacy
- Information/Content Centric Networking (ICN/CCN)
- Performance Analysis/Simulation/Experiment

## 2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Manuscripts should be prepared according to the guideline in the "Information for Authors." The latest version is available at the web site, [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html). The term for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site [https://review.ieice.org/regist/regist\\_baseinfo\\_e.aspx](https://review.ieice.org/regist/regist_baseinfo_e.aspx) by **13th May 2019 (JST)**. Authors should choose the "Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure" as a "Journal/Section" on the online screen. Do not choose [Regular EB].

### Contact point:

**Kazuya Tsukamoto**

**Department of Computer Science and Electronics, Kyushu Institute of Technology**

**Tel: +81-948-29-7652, E-mail: ns-ss2019-kanji@mail.ieice.org**

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**Guest Associate Editors:** Kenichi Kashibuchi (NTT), Kazuhiko Kinoshita (Tokushima Univ.), Nattapong Kitsuwan (UEC), Tomonori Maegawa (Toshiba), Masahiro Sasabe (NAIST), Yuya Tarutani (Osaka Univ.), Toyoki Ue (Panasonic), Norio Yamagaki (NEC), Hiroshi Yamamoto (Ritsumeikan Univ.), Taku Yamazaki (Shibaura Inst. of Tech.)

\* Authors must agree to the "Copyright Transfer and Page Charge Agreement" via electronic submission.

\* Upon accepted for publication, all authors, including authors of invited papers, should pay the page charges covering the partial cost of publication around October 2019. For detailed information, please visit [http://www.ieice.org/eng/shiori/page2\\_cs.html#5](http://www.ieice.org/eng/shiori/page2_cs.html#5)

\* At least one of the authors must be an IEICE member when the manuscript is submitted for review. Invited papers are an exception. We recommend that authors unaffiliated with IEICE apply for membership. For membership applications, please visit <http://www.ieice.org/eng/member/OM-appli.html>

\* The accepted papers will be published online soon on the web site of Transactions Online after the payment of page charges has been completed. For detailed information, please visit [http://www.ieice.org/eng/shiori/page2\\_cs.html#8](http://www.ieice.org/eng/shiori/page2_cs.html#8)

## Call for Papers

----- Special Section on Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019 -----

The IEICE Transactions on Communications announces that it will publish a special section entitled " Special Section on Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019 " in the **September 2020 issue**.

In the Electromagnetic Compatibility (EMC) field, there are conventional research topics such as interference among electronic equipment and on telecommunications. Recently, there raises new research topics with rapid spread of information communication technology: security and interference issue in IoT and wireless technologies and wireless power transfer technology that improves our lifestyle. Moreover, relation between nature phenomenon and electromagnetic environment and bioelectronics interactions are still important topics. The EMC field becomes much important in several many academic and industrial fields. In the June 2019, an international symposium on EMC (EMC Sapporo & APEMC 2019) will be held in Sapporo, Japan and many EMC issues will be discussed there. Because of such reasons, a special section is being planned (scheduled to appear in the September 2020 issue) to further promote research and development of future EMC fields as follows.

### 1. Scope

This special section aims at timely dissemination of research in these areas. Possible topics include, but are not limited to:

**EMC Management:** *Laboratory Accreditation, EMC Education, EMC Measurements: Standards and Regulations, Radiated and Conducted Emission and Immunity tests, Emission limits, Test Instrumentation & Facilities, Electromagnetic Environment: Natural and Man-made noise source, Control Intentional and Unintentional Emissions, Electromagnetic Interference Control: Shielding, Grounding & Meta-materials, High Power Electromagnetics: ESD and Transients, Lightning EM fields and Currents, EMP and IEMI, Information Leakage, Spectrum Engineering: Adaptive Interference Mitigation, Communications System EMC, Antenna and Wave Propagations, Low Frequency EMC: Power System EMC, Renewables, Electric Vehicles, Energy Efficient Technologies, Computational Electromagnetics: Numerical Modeling, Signal and Power Integrity: Chip, Package, PCB & Cables, Transmission Lines, Nanotechnology & Advanced Materials: Nanomaterials, Nanotubes and Nanofibers for Gaskets and Absorbing Screens, EMC for Emerging Wireless Technologies: Wireless Coexistence, Intra-System Interference, Wireless Power Transfer, Smart Grid, Power Electronics EMC: Power Electronics Converters/Inverters EMI/EMC, Grid-Connected PV Systems, Wind Farms, Transportation & Vehicles EMC, EMF Safety & Biomedical Issues, Human exposure to ELF/RF EM fields, Biological Effects, Medical Application, Medical Devices & Hospital Equipment, Others.*

### 2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Manuscripts should be prepared according to the guideline in the "Information for Authors." The latest version is available at the web site, [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html). The term for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site [https://review.ieice.org/regist/regist\\_baseinfo\\_e.aspx](https://review.ieice.org/regist/regist_baseinfo_e.aspx) by **October 1 2019 (JST)**. Authors should choose the [Special-MC] Special Section on Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019 as a "Journal/Section" on the online screen. Do not choose [Regular EB].

#### Contact point:

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### 3. Special Section Editorial Committee

**Guest Editor-in-Chief:** Shinobu Ishigami (Tohoku Gakuin Univ.)\*

**Guest Editors:** Tohlu Matsushima (Kyushu Inst. of Tech.), Takahiro Aoyagi (Tokyo Tech)

**Guest Associate Editors:** Yoshiharu Akiyama (NTT), Katsumi Fujii (NICT), Takashi Hikage (Hokkaido Univ.), Hiroshi Hirayama (Nagoya Inst. of Tech.), Takaaki Ibuchi (Osaka Univ.), Ken Kawamata (Tohoku Gakuin Univ.), Kimihiro Tajima (NTT-AT), Tomoo Ushio (Tokyo Metropolitan Univ.), Fengchao Xiao (Univ. of Electro-Communications), Takahiro Yoshida (Tokyo Univ. of Sci.)

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\* Upon accepted for publication, all authors, including authors of invited papers, should pay the page charges covering the partial cost of publication around February 2020. For detailed information, please visit [http://www.ieice.org/eng/shiori/page2\\_cs.html#5](http://www.ieice.org/eng/shiori/page2_cs.html#5)

\* At least one of the authors must be an IEICE member when the manuscript is submitted for review. Invited papers are an exception. We recommend that authors unaffiliated with IEICE apply for membership. For membership applications, please visit <http://www.ieice.org/eng/member/OM-appli.html>

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## Call for Papers

# ----- Special Section on New Era of Satellite Communication / Broadcasting / Application Technologies -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on New era of Satellite Communication/Broadcasting/Application Technologies" in the October 2020 issue.

Satellite communications have been mainly used for disaster-relief communications, backup communications and/or mobile communications on maritime ships and airplanes. Recently, due to remarkable technology progress on both satellite and terrestrial stations, HTS (High Throughput Satellite) systems consisting hundreds of multi-beams and/or thousands of small satellites have started to provide broadband services for earth stations in motions and as backhaul for cellular phone. On the other hand, as for satellite broadcasting, 4K/8K special technologies have been studied so as to be standardized. Its TV services will be widely spread all over the Japan toward 2020. Further, these developed technologies are applied to many other use for such as UAS (Unmanned Aircraft System), HAPS (High Altitude Platform System), Monitoring system using AIS (Automatic Identification System) and so forth.

This special section will provide an opportunity to summarize the recent research output on satellite communication/broadcasting/application technologies. Your contribution to this special section would be greatly appreciated.

## 1. Scope

This special section aims at timely dissemination of research in these areas. Possible topics include, but are not limited to:

- Satellite communications (fixed-satellite communications, mobile satellite communications, inter-satellite communications, optical satellite communications, deep space communications, HTS, MEO, LEO)
- Satellite broadcasting (BS, mobile broadcasting, 4K/8K)
- Satellite applications (Unmanned aircraft communications system, HAPS, AIS, Positioning)
- Others on the elementary technologies, the system/earth station technologies, the onboard technologies and the applications concerning the above topics.

## 2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Manuscripts should be prepared according to the guideline in the "Information for Authors." The latest version is available at the web site, [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html). The term for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site [https://review.ieice.org/regist/regist\\_baseinfo\\_e.aspx](https://review.ieice.org/regist/regist_baseinfo_e.aspx) by **October 1, 2019 (JST)**. Authors should choose the [Special-CB] Special Section on Satellite Communication/Broadcasting/Application Technologies as a "Journal/Section" on the online screen. Do not choose [Regular EB].

### Contact point:

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## 3. Special Section Editorial Committee

**Guest Editor-in-Chief:** Fumihiro Yamashita (NTT)

**Guest Editors:** Shinobu Nanba (KDDI Research, Inc.), Kazuto Yano(ATR)

**Guest Associate Editors:** Takahiro Aoyagi (Tokyo Tech. Univ.), Tetsushi Ikegami (Meiji Univ.), Hiroyasu Ishikawa (Nihon Univ.), Masato Saito (Ryukyu Univ.), Taro Suzuki (Waseda Univ.), Yoshinori Suzuki (ATR), Shigenori Tani (Mitsubishi Electric), Hitoshi Nakagawa (B-SAT), Kazunori Yokohata (NHK), Takashi Takahashi (NICT), Yoshiyuki Fujino (Toyo Univ.), Kousuke Yamazaki (KDDI Research, Inc.)

\* Authors must agree to the "Copyright Transfer and Page Charge Agreement" via electronic submission.

\* Upon accepted for publication, all authors, including authors of invited papers, should pay the page charges covering the partial cost of publication around April 2020. For detailed information, please visit [http://www.ieice.org/eng/shiori/page2\\_cs.html#5](http://www.ieice.org/eng/shiori/page2_cs.html#5)

\* At least one of the authors must be an IEICE member when the manuscript is submitted for review. Invited papers are an exception. We recommend that authors unaffiliated with IEICE apply for membership. For membership applications, please visit <http://www.ieice.org/eng/member/OM-appli.html>

\* The accepted papers will be published online soon after notification of acceptance on the web site of Transactions Online. For detailed information, please visit [http://www.ieice.org/eng/shiori/page2\\_cs.html#8](http://www.ieice.org/eng/shiori/page2_cs.html#8)



## Call for Papers

### ----- Special Cluster in Conjunction with IEICE General Conference 2019 -----

The IEICE Communications Express (ComEX) announces that it will publish a special cluster entitled “Special Cluster in Conjunction with IEICE General Conference 2019” in **December 2019**. ComEX is an online open access letter journal with binary peer review publishing system established in June 2012 by the IEICE covering the entire field of communications. The editorial committee of ComEX thinks much of rapid yet careful peer review, and the average period from submission to decision is less than one month in 2018 and the acceptance rate is 47% in 2017. In order to keep the promptness of the review process and provide high quality letters in a timely manner, the numbers of words and items (Figures plus Tables) in the manuscript are limited up to 1500 and 3, respectively. We believe those requirements are met by typical papers presented at IEICE General Conference or IEICE Society Conference meaning that papers of the conferences can be submitted to ComEX after polishing sentences without significant addition and/or change of the items. Based on the above considerations, the editorial committee of ComEX has planned the special cluster to seamlessly publish letters in the entire field of communications from, but not limited to, authors of IEICE General Conference 2019.

#### 1. Scope

This special cluster aims at seamless publication of the work in the entire field of communications. Possible topics include, but are not limited to, Fundamental Theories for Communications, Energy in Electronics Communications, Transmission Systems and Transmission Equipment for Communications, Optical Fiber for Communications, Fiber-Optic Transmission for Communications, Network System, Network, Internet, Network Management/Operation, Antennas and Propagation, Electromagnetic Compatibility (EMC), Wireless Communication Technologies, Terrestrial Wireless Communication/Broadcasting Technologies, Satellite Communications, Sensing, Navigation, Guidance and Control Systems, Space Utilization Systems for Communications, and Multimedia Systems for Communications.

#### 2. Submission Deadline

Two submission periods are prepared for this special cluster, and the deadlines are set as:

- **First deadline: May 31st, 2019 (JST)** (Submission will open about one month prior to the first deadline.)
- **Second deadline: July 11th, 2019 (JST)** (Submission will open on June 21st, 2019.)

#### 3. Submission Instructions

The maximum number of words is 1500; the maximum number of items (Figures plus Tables) is 3. Manuscripts should be prepared according to the guideline in the “Information for Authors.” The latest version is available at the web site, [http://www.comex.ieice.org/data/for\\_authors.html](http://www.comex.ieice.org/data/for_authors.html). In particular, please refer to the paragraph on novelty. Review process will begin immediately after submission.

The notification of review evaluation for the letter submitted in the first submission period and that in the second one will be sent by June 20th, 2019 and July 31st, 2019, respectively. In the second period, prospective authors are allowed to submit not only a manuscript which has not been submitted to this special cluster in the first submission period but also a revised version of the manuscript which was rejected in the first submission period. In such a case, the authors are encouraged to indicate a manuscript ID assigned in the first submission period and to append a "Reply Letter" to expedite the review process. Accepted papers will appear on the IEICE ComEX web site as advance publication as soon as payment of the article charge is confirmed by the ComEX Publishing Office. All of them will appear as a special cluster in ComEX web site on December 1st, 2019.

ComEX will accept only the letter type of manuscripts by electronic submission using one of the officially approved formats (LaTeX style file or Microsoft Word template). Submit a manuscript and electronic source files (LaTeX/Word files, figures) via the IEICE Web site [https://review.ieice.org/regist/regist\\_baseinfo\\_e.aspx](https://review.ieice.org/regist/regist_baseinfo_e.aspx). In this regard, authors should choose [in Conjunction with IEICE General Conference 2019] as a “Journal/Section” on the online screen. Do not choose [Regular-XB].

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**Email:** [comex-ss-gc2019@ieice.org](mailto:comex-ss-gc2019@ieice.org)

#### 4. Special Cluster Editorial Committee

**Guest Editor-in-Chief:** Hiroo Sekiya (Chiba Univ.)

**Guest Editors:** Masaki Bandai (Sophia Univ.), Kazunori Hayashi (Osaka City Univ.)

**Guest Associate Editors:** Yuyuan Chang (Tokyo Inst. of Tech.), Mariusz Glabowski (Poznan Univ. of Tech.), Rokuzo Hara (Mitsubishi Electric), Hiroaki Harai (National Inst. of Info. and Commun. Tech.), Yuki Yoshi Kamio (National Inst. of Info. and Commun. Tech.), Noriaki Kamiyama (Fukuoka Univ.), Hiroshi Kubo (Ritsumeikan Univ.), Ayumu Kubota (KDDI R&D), Tzyh-Ghuang Ma (National Taiwan Univ. of Sci. and Tech.), Ryutaroh Matsumoto (Nagoya Univ., Aalborg Univ.), Hiroaki Morino (Shibaura Inst. of Tech.), Wakaha Ogata (Tokyo Inst. of Tech.), Masakatsu Ogawa (Sophia Univ.), Chuwong Phongcharoenpanich (King Mongkut's Inst. of Tech. Ladkrabang), Nordin Ramli (Malaysian Inst. of Microelectronic Systems), Yuji Sekiya (The Univ. of Tokyo), Takatoshi Sugiyama (Kogakuin Univ.), Hidenori Takahashi (KDDI R&D), Ryo Yamaguchi (Softbank Mobile), Shuto Yamamoto (NTT), Miao Zhang (Xiamen Univ.)

\* Authors must agree to the “Copyright Transfer and Page Charge Agreement” via electric submission.

\* Please note that if accepted, all authors are requested to pay for the article charges.

\* At least one of the authors must be an IEICE member when the manuscript is submitted for review. We recommend that authors unaffiliated with IEICE apply for membership. For membership applications, please visit the web-page, <http://www.ieice.org/eng/member/OM-appli.html>.



**Membership for Overseas Candidates:** Overseas Members may opt to join **one IEICE Society of their choice** and may request to receive the **IEICE Transactions of online version** of that Society. Furthermore, Overseas Members may request to receive the IEICE Journal (written in Japanese) and Transactions (published in paper) at an additional cost. Similar services are available to **Overseas Student Members**. Voting privileges in the IEICE election do not apply to Overseas Members. Note that the Overseas Membership applies only to candidates who reside outside of Japan and who have citizenship in countries other than Japan.

**OMDP (Overseas Membership Development Program):** OMDP is provided for candidates **from countries/areas in Asia (except Republic of Korea and Taiwan), Africa, Central America, and South America**. This program is designed so that IEICE can contribute to and support the progress of science and technology throughout the world. Scientists and engineers in these countries/areas are encouraged to apply to the program.

● **IEICE Societies and Publications**

Society	Transactions	Editorial Subject Indexes
<b>A</b> (Fundamentals of Electronics, Communications and Computer Sciences)	EA (English) A (Japanese)	Engineering Acoustics, Noise and Vibration, Speech and Hearing, Ultrasonics, Digital Signal Processing, Analog Signal Processing, Systems and Control, Nonlinear Problems, Circuit Theory, VLSI Design Technology and CAD, Numerical Analysis and Optimization, Algorithms and Data Structures, Graphs and Networks, Reliability, Maintainability and Safety Analysis, Cryptography and Information Security, Information Theory, Coding Theory, Communication Theory and Signals, Spread Spectrum Technologies and Applications, Mobile Information Network and Personal Communications, Intelligent Transport System, Image, Vision, Computer Graphics, Language, Thought, Knowledge and Intelligence, Human Communications, Neural Networks and Bioengineering, Multimedia Environment Technology, Communication Environment and Ethics, Concurrent Systems, Measurement Technology, General Fundamentals and Boundaries
<b>B</b> (Communications)	EB (English) B (Japanese)	Fundamental Theories for Communications, Devices/Circuits for Communications, Transmission Systems and Transmission Equipment for Communications, Optical Fiber for Communications, Fiber-Optic Transmission for Communications, Switching for Communications, Switching for Mobile Communications, Network, Network Management/Operation, Internet, Wireless Communication Technologies, Terrestrial Radio Communications, Satellite Communications, Optical Wireless Communications, Antennas and Propagation, Electromagnetic Compatibility (EMC), Sensing, Navigation, Guidance and Control Systems, Energy in Electronics Communications, Terminals for Communications, Multimedia Systems for Communications, Broadcast Systems, Integrated Systems for Communications, Space Utilization Systems for Communications
<b>C</b> (Electronics)	EC (English) C (Japanese)	Electromagnetic Theory, Lasers, Quantum Electronics, Optoelectronics, Microwaves, Millimeter-Waves, Ultrasonic Electronics, Electronic Circuits, Electronic Materials, Organic Molecular Electronics, Electronic Components, Electromechanical Devices and Components, Semiconductor Materials and Devices, Integrated Electronics, Electron Tubes, Vacuum and Beam Technology, Electronic Displays, Superconducting Electronics, Storage Technology, Electronic Instrumentation and Control
<b>D</b> (Information and Systems)	ED (English) D (Japanese)	Computation and Computational Models, Automata and Formal Language Theory, Algorithm Theory, Complexity Theory, Computer Components, VLSI Systems, Computer Systems, Fundamentals of Software and Theory of Programs, System Programs, Software Engineering, Database, Contents Technology and Web Information Systems, Data Mining, Networks, Dependable Computing, Application Information Security, Distributed Cooperation and Agents, Artificial Intelligence and Cognitive Science, Human-computer Interaction, Office Information Systems, e-Business Modeling, Educational Technology, Rehabilitation Engineering and Assistive Technology, Pattern Recognition, Speech and Hearing, Image Processing and Video Processing, Image Recognition, Computer Vision, Computer Graphics, Multimedia Pattern Processing, Natural Language Processing, Biocybernetics, Neurocomputing, Biological Engineering, Music Information Processing, Kansei Information Processing, Affective Information Processing
<b>Journal of IEICE (written in Japanese only)</b>		

● **Membership Charges (<http://www.ieice.org/eng/member/OM-appli.html#c>)**

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**Basic Membership Charge (UNIT : Japanese YEN)**

Service coverage for overseas members	Admission charge	Online Version		Paper Version (optional)
		Registration of the first society (includes its online version transactions)	Registration of additional societies (includes its online version transactions)	Journal (written in Japanese)
Member (overseas)	1,400	7,000	3,500 / 1society	6,000
Member (overseas) with OMDP*	1,000	5,000	3,000 / 1society	6,000
Student member (overseas)	-	2,000	2,000 / 1society	6,000
Student member (overseas) with OMDP*	-	1,000	1,500 / 1society	6,000

NOTE

- You need to choose one Society, and you can subscribe Transactions online of your registered society.  
Example: If you want to subscribe to Transaction of EA, please check **Society Registration** as "A", and your membership fee amounts to 7,000 yen / 5,000 yen.
- If you want to register other Societies and Transaction of web version, please check "**Additional Society registration**".  
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- If you want to change membership from Member (In Japan) to Overseas Member, you don't need to pay an Entrance charge.

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Areas	Air mail	SAL mail
Asia; Guam; Midway islands	5,600 yen	3,200 yen
Oceania; Near & Middle East; North & Central America; Europe	7,800 yen	4,400 yen
Africa; South America	11,000 yen	5,600 yen

**Please contact the IEICE Membership Section:** E-mail: [member@ieice.org](mailto:member@ieice.org) FAX: +81 3 3433 6659 Please fill out the application form printed on the next page.

## IEICE Overseas Membership Application Form

URL <http://www.ieice.org/eng/member/OM-appli.html> E-mail [member@ieice.org](mailto:member@ieice.org) FAX +81-3-3433-6659

◆ **Please type or print in English. The deadline for submitting application form is the 1<sup>st</sup> day of every month.**

### Personal Information

**Full name:** First name \_\_\_\_\_ Middle name \_\_\_\_\_ Last name \_\_\_\_\_ **Nationality:** \_\_\_\_\_  Male  
 Female  
 Prof.  Dr.  Mr.  Ms. **Place of birth:** \_\_\_\_\_ **Date of birth:** \_\_\_\_\_  
 Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_

### Mailing Address

Home  Office

Name of Company/School/College \_\_\_\_\_ Department/Section \_\_\_\_\_  
 Street \_\_\_\_\_ City \_\_\_\_\_ State/Province \_\_\_\_\_  
 Postal code \_\_\_\_\_ Country \_\_\_\_\_  
 TEL \_\_\_\_\_ FAX \_\_\_\_\_ E-mail \_\_\_\_\_

### Academic Background

The highest academic degree:  Ph.D.  Masters  Bachelors  Others: \_\_\_\_\_

University/college/school of the highest academic degree \_\_\_\_\_ Month & year of graduation \_\_\_\_\_

(For Student Member) Academic degree which will be conferred on you \_\_\_\_\_ Month & year when the degree will be conferred on you \_\_\_\_\_

### Application Information

**Membership:** I want to apply for the following membership (check one item!)

- Member (Overseas)  Student Member (Overseas)  
 ◆ If you want to apply for OMDP, please check;  OMDP (Overseas Membership Development Program)

**Society registration (Membership fee includes one Society of Transaction of Online version.):**

- A: Engineering Sciences  B: Communications  C: Electronics  D: Information and Systems

**Additional Society (optional):**  A: Engineering Sciences  B: Communications  C: Electronics  D: Information and Systems

**Additional Transactions of paper version (optional):**

- EA: Fundamentals  EB: Communications  EC: Electronics  ED: Information and Systems  
 A: Fundamentals (Japanese)  B: Communications (Japanese)  C: Electronics (Japanese)  D: Information and Systems (Japanese)

**Journal subscription (optional):**  (Japanese)

### Remittance

Remittance is available only in *Japanese yen* by a *credit card*.

Admission charge.....¥ \_\_\_\_\_ Journal subscription (optional).....¥ \_\_\_\_\_  
 Annual charge.....¥ \_\_\_\_\_ Mailing option:  Air mail.....¥ \_\_\_\_\_  
 Additional Society (optional) ..... ¥ \_\_\_\_\_  SAL mail.....¥ \_\_\_\_\_  
 Additional Transactions (optional).....¥ \_\_\_\_\_ **Total**.....¥ \_\_\_\_\_

Credit Card:  UC  Master Card  VISA  JCB  American Express

Card number: 

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 Year \_\_\_\_\_ Month \_\_\_\_\_

### Endorsement

Endorsements by one IEICE Member application is required. If it is difficult to find endorsers, please contact the IEICE Membership Activities Section by sending this sheet, and we will help you.

I recommend this applicant for IEICE membership.

Endorser's name \_\_\_\_\_ Membership number \_\_\_\_\_ Endorser's signature \_\_\_\_\_ Date \_\_\_\_\_



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for Sister Society Members**

To foster the cooperation between the Sister Society and the IEICE Communications Society (IEICE-CS), the Sister Society agreement enables members of each institution to become members of both societies by granting special annual fees.

A 10% - 20% discount\* of the annual fees will be granted to the sister society members to become the IEICE-CS overseas members. The discounted fees will be applied for the individual members when the new membership is starting or the current membership is renewing.

\* The discount does not apply to the optional items and services i.e. “Additional Society”, “Additional Transactions of paper version” and “Rapid Mailing Service”.

----- Please send the following Sister Society membership information, together with membership application form in the next page. -----

**Sister Society membership information**

***To apply discount rates for this IEICE-CS Sister Society member’s application, please indicate your Sister Society Membership number below, and attach a copy of your Sister Society Membership certificate or card to this form.***

Sister Society:     IEEE ComSoc         KICS         VDE-ITG

Membership number (Member): \_\_\_\_\_

Copy of Membership certificate or Membership card:

(Attached here)

## From Editor's Desk

### ●Climbing Mountain

I'm Yoshitaka Enomoto, Director of Planning and Member Activities of IEICE-CS. I live in Tsukuba city located in the north of Tokyo. There are mountains including Mt. Tsukuba in Tsukuba city, and I and my wife climb them several times a year. They are close to my house and we can refresh easily. How about trying to find a place where you can refresh easily?



Mt. Tsukuba.

### ●IEICE General Conference 2019

IEICE General Conference 2019 will be held at Waseda University, Tokyo, March 19<sup>th</sup> – 22<sup>nd</sup>, 2019. Please check out the latest conference information on the IEICE web site at:  
<http://www.ieice-taikai.jp/2019general/en/index.html>

### ●Goodbye Heisei Era and Welcome New Era

How do you like the last GLOBAL NEWSLETTER of Heisei Era? The Heisei Era will end and a new era will begin on May 1<sup>st</sup>, 2019. We published GLOBAL NEWSLETTER 67 times in Heisei Era. We will share global activity information with IEICE-CS members as well in the next era!

IEICE-CS GLOBAL NEWSLETTER Editorial Staff

#### Editorial Staff of this issue

No special order is observed.



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*To Probe Further and Keep Up-to-date with Communication Technologies*

# **IEICE Communications Society**



## **IEICE General Conference 2019**

**19–22 March 2019**

**Waseda University, Nishiwaseda Campus, Tokyo**

Every spring, each Society organizes a General Conference to provide a forum where members can present their study results and exchange views. At present, four of the Societies -- the Engineering Sciences Society, the NOLTA Society, the Communications Society, and the Electronics Society -- hold their Society Conferences as a joint event. The Communications Society Conference includes English-language sessions in addition to the Japanese-language sessions.

Please check out the latest information on the IEICE web site at:

<http://www.ieice-taikai.jp/2019general/en/index.html>

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